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Postmaster General.

TELEPHONE ENGINEER

Volume XIX *CHICAGO, MARCH, 1918* *Number 3*

"Our Operators' Wages Have Gone Up 40 Per Cent in the Past Year"

Says the General Manager of a prominent telephone company now operating Manual Equipment.

This is one important reason why his Company has decided to install the Automatic.

Universally Excellent Service

(preferred by every subscriber he interviewed) is another great reason for eliminating the switchboard operators.

THE AUTOMATIC

in your exchange will give you the same desirable results.

AUTOMATIC ELECTRIC CO.
CHICAGO

The Holtzer-Cabot Lineman's Test Set Only Weighs 7½ lbs.

This makes every lineman glad to carry it.

It contains everything that he needs—a Generator, Ringer, Transmitter, Watch-Case Receiver.

The generator is especially worthy of mention. It is a 3-bar special design, and the permanency of the magnets may be depended upon. It is a powerful little generator.

With the receiver in the holder, the Generator rings through the buzzer. With the receiver out of the holder, it rings direct to line; the receiver at the same time is shunted out by the generator.

With the receiver out of the holder, the generator will ring ten 1600-ohm bells through a resistance of 4000 ohms.

The Holtzer-Cabot Electric Co.
CHICAGO, ILL. and BOSTON, MASS.

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The next thing to decide is what kind of tools to buy.

When construction work is as costly as it is nowadays, cheap tools are doubly expensive. They mean slow work, poor work, and exasperating delays due to broken or defective tools.

OSHKOSH TOOLS have for many years given more than satisfactory service on telephone work in all parts of the country. Their quality is proverbial and is being rigidly maintained regardless of material conditions.

OSHKOSH TOOLS will prove the most economical in the long run.

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Oshkosh, Wis.

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PAUL N. WOODRUFF, Editor
Monadnock Building, CHICAGO

New York Office, 1022 Longacre Building
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VOL. XIX — CHICAGO, MARCH, 1918 — NO. 3

Cutting Down Directory Costs

DIRECTORY printing is a light burden on small telephone companies; but when the subscriber list begins to mount into thousands, it becomes a considerable item. Not only does the thickening bulk of the volume keep pace with the growing number of copies, increasing the cost as the square of the contents, so to speak; but sooner or later a point is reached which necessitates printing more frequently than once a year. Thus it might happen that doubling the number of subscribers would demand the printing twice as often of twice as many copies of a book twice as big. In that case the cost of directory printing per annum would be, not doubled, but multiplied nearly eight times. Obviously there is a chance here for some conservation.

Frequency of issue is dictated by the rapidity with which changes accumulate in the records of subscribers. The lists of new subscribers and new numbers for old subscribers must be given to the public as early as possible. If they are not given out, the chief operators and information clerks become overburdened with inquiries, necessitating additional help—to say nothing of the additional false calls which must be handled by the traffic department. It is evident, then, that efforts to economize by reducing the frequency of issue of directories is likely to defeat itself and actually create added expense in labor.

Small companies get around this condition by issuing bulletins of new numbers and changes at frequent intervals, thus avoiding the task of reprinting the whole directory from the standing type.

With a list of considerable size, however, this method would prove a wasteful makeshift. It would force the subscriber to consult a bulletin, and perhaps more than one, before referring to his directory, an objectionable inconvenience; and this would result in throwing some of the work back on the information desk again. There is little opportunity, therefore to conserve on reprinting of directories.

It is customary for many companies to give the subscriber a directory for each extension telephone, besides one for his regular station. Some saving may be made here, with the co-operation of the subscriber himself. An explanation of the situation will induce the majority of such subscribers to get along with at least one less directory. The aggregate saving is small, but something. But of course there is an irreducible minimum number of directories that must be printed distributed in each case, putting a stop to conservation along that line.

The logical place to save in directory cost, therefore, is in the book itself. Here there are two chances: By using a cheaper paper stock, and by putting more names on a page, resulting in fewer pages. The first course needs no explanation, beyond advising the help of the printer in selecting a suitable stock.

The larger Bell Companies are now running four columns of names to the directory page. The size of the paper page is nine by eleven inches, and the size of the type page is eight and a fourth by ten and a half inches, leaving very little white margin. Each column is two inches wide and contains about one hundred and twenty lines of type, making four hundred and eighty lines to the page. Possibly ten per cent of the listings require two lines, giving some four hundred and thirty names to the page. All the readily understood

abbreviations are used to condense the line. Because small type is used the subscribers' names and exchange names are distinguished from the street address by using black face type.

With the two inch column as an approximate standard, the printer can help in working out several sizes of directory page, one of which should be suitable for almost any list of subscribers.

Two, three or four column pages could be used, with either one hundred, two hundred or four hundred names to the page. The printer will also know about the cutting and folding of paper stock to the best advantage for different page sizes. It is better to consult his expert knowledge than to determine arbitrarily upon a certain size.

A directory so printed is compact to the last degree, and yet there can be no criticism of it on the score of legibility. And a telephone directory is wholly utilitarian. It need have no artistic value; and so long as it is absloutely free from typographical errors, the question of typographical beauty may be dismissed.

When we speak of it as utilitarian perhaps most of us do not fully realize how much more than just a telephone directory a telephone directory really is. It has become practically the official city directory of its community. It is consulted daily by thousands upon questions other than telephonic; and the names which cannot be found in it are of little consequence anyway—they belong to that no-account "Notel" family, which is rapidly dying out.

So the telephone directory is a public institution almost more useful than the telephone itself; an indispensable guide to all the worth-while people in the world. Conservation movements upon it should keep that fact in mind and stop short of interference with the Great List.

* * *

Federal Aid to Higher Rates

IT is characteristic that the new public utilities policy of the administration does not mention telephones—characteristic of most public utilities activities. Why it is that the telephone interests are generally excluded from the conventional public service groups we do not know. Probably it does not matter anyway, because the telephone must stand on its own bottom and is able to do it.

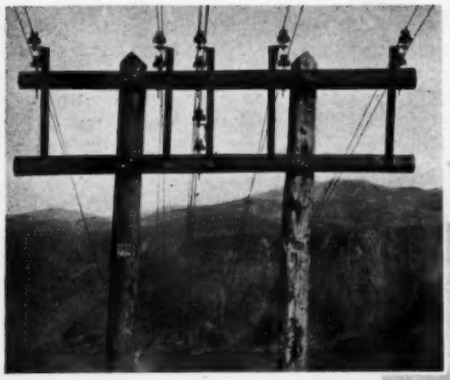
The Washington dispatch says, "With the approval of President Wilson the federal railroad administration is about to interest itself in street railway, light, heat, and power companies throughout the country whose financial stability may be threatened by mounting costs of operation. Where is appears necessary increases in fares or rates may be suggested. Correspondence between Secretary McAdoo as director general of railroads and the President discloses that a committee representing public utility interests recently presented memoranda to the secretary setting forth a most serious situation and asking that it be brought to the attention of the President.. Mr. McAdoo and the President agreed that public utilities are a necessary part of the nation's equipment for war, and the secretary was authorized to communicate with local authorities in behalf of utilities found to need assistance."

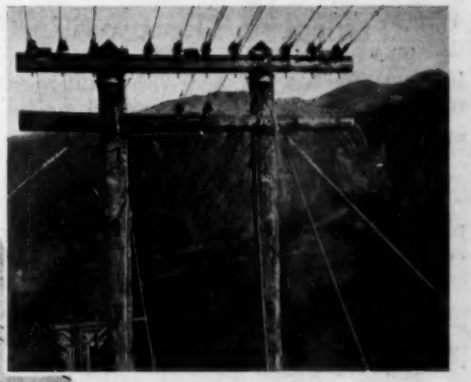
It is obvious that operating telephone utilities will benefit, if only indirectly, by this attitude of the administration. With the seal of authoritative approval set upon rate raising enterprise in other fields, the public cannot but accede to the pleas of telephone men for a living wage.

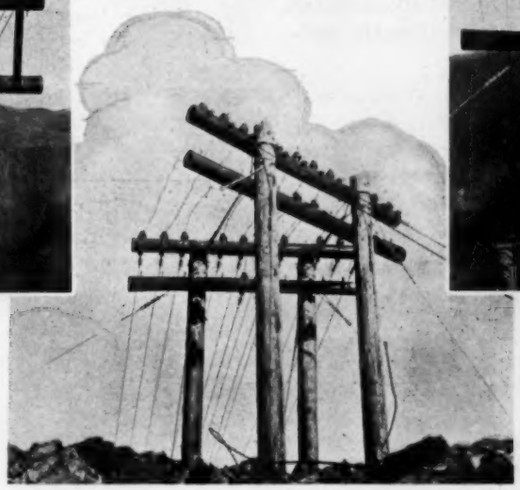
The habitual objection of the people to rate increases arises from suspicion and doubt of the necessity for higher rates. When they are convinced that it is actually possible for a corporation to lose money, they will not be disposed to make the telephone company the goat for the enforced increases of other utility rates.

It is quite probable that telephones are included though unnamed, in the new administration policy, since there is no reason for excluding them. It would be desirable, however, to secure definite recognition of that condition. Naturally there will be no disposition on the part of the federal authorities to interfere with the jurisdictions of state governing bodies, as is shown by the President's statement, "I hope that state and local authorities, where they have not already done so, will, when the facts are properly laid before them, respond properly to the necessities of the situation."

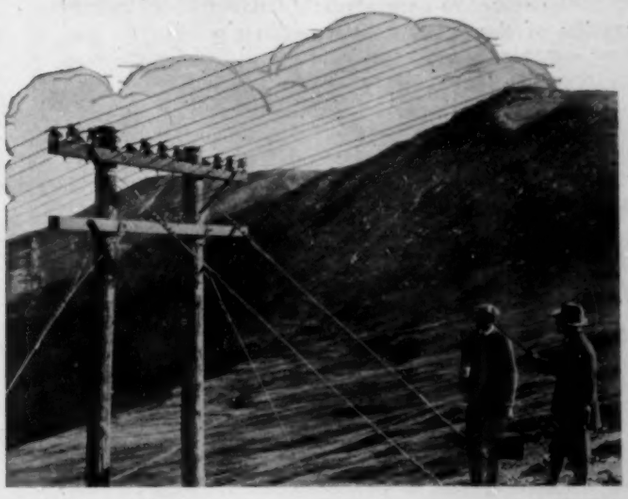
STORIES IN PICTURES OF TELEPHONE PRACTICE AND PROGRESS IN ALL PARTS OF THE WORLD.







These views show some of the unusual construction employed by the Mountain States Telephone and Telegraph Company on the Denver-Leadville Toll Line via Argentine Pass, and are taken from an article by Philip H. Dexter, Eastern Division Plant Department, in the "Mountain States Monitor." Above is a close-up view of an "H" fixture carrying special transposition brackets. Top center shows a head fixture on the summit of the divide, showing massive construction necessary to withstand enormous strain. Upper right is "H" fixture showing Chapman arresters installed to allay heavy static discharges, very common during spring and summer. The three cuts across the center show an "H" fixture with circuits deadened both ways, with Chapman arresters installed and something of the nature of the country traversed, where solid rock formations often barred the groundman's way. At the bottom are shown the 72 per cent grade of the west slope, and a fixture using No. 2 break irons, installed with the aid of an engineer's transit to get the angle.



Telephone Progress in Cuba

The progressiveness of a country may be measured by the state of development of its telephonic communications, the extent to which the telephone is in general use, and the kind of equipment in service.

Cuba, therefore, may well be proud of its telephone system. In proportion to its area and population, this country ranks with the most highly developed in telephone service. Considering its size, it leads all Latin America, says G. H. S. Rollason, assistant general manager and chief engineer of the Cuban Telephone Company.

The city of Havana has today five telephones for every one hundred men, women and children, rich and poor, within its borders. In proportion to its population, it has more telephones than London, Paris, Petrograd, or Vienna, and half as many as New York, the telephone capital of the world.

Yet it is only six short years ago that the Cuban Telephone Company, to which this remarkable development is due, obtained its concession from the Cuban Republic.

The telephone history of Cuba dates back to 1888, when the government of Spain promulgated a decree for the establishment and development of telephone systems in the colonies of Cuba, Porto Rico and the Philippine Islands. Today Havana alone has three times as many telephones as Madrid. Nearly one-tenth of all the telephones in Central and South America and the West Indies are in Cuba. Per 100 population, Havana has more telephones than Mexico City, Caracas, Guayaquil, Montevideo, Guatemala, Santiago de Chili, Rio de Janeiro, or any other city in Latin America, and nearly twice as many as Buenos Aires.

In 1889, at the time of the first American occupation, the Campañia de la Red Telefónica de la Habana, which company was organized under the laws of Spain, and operating under the Spanish grant, had installed in all 1,200 Blake magneto instruments whose service left much to be desired.

The inadequacy of this telephone system was at once recognized by the Americans and capitalists saw the opportunity for investment in its reorganization. The majority of the Spanish company stock was, therefore, acquired, and in 1900 an American company was organized and engineers and telephone experts were sent to Cuba to study and report on the physical condition of the system then in operation. It was found to be so antiquated and the service so bad that a complete new installation was considered absolutely essential.

The complete reconstruction, modernization, and extension of the old system was therefore begun, and the new organization was able to be of great service to the government during the military occupation.

Then came the evacuation of the military authorities and the constitution of the first republic, and although the second assembly of the congress of this administration approved a new national telephone bill, it was vetoed by the president.

Nothing, then, of any importance occurred in the telephone field until the provisional government of the United States, during the second intervention (1906-1907) gave some attention to the necessities of the urban telephone service, but a project which was drawn up never became a law.

The first big step forward was taken, the impetus that has made Cuba one of the first countries in the world as regards excellence of telephone communication was given when on September 9, 1909, President Gómez signed a decree giving to Captain Talbott, representing the Cuban Telephone Company, a perpetual concession to furnish local and long-distance telephone service in the island, with authority to purchase and operate the few existing local concessions, most of which, under the old Spanish grants, had but a short time to run before they reverted to the government, and to build local exchanges in any other city or town that might require them.

Under the terms of the concession the company was required to complete, with a capacity of not less than 18,000 telephones, within a term of eighteen months from April 21, 1910, the new plant in Havana; to establish a local and national service which, radiating from the capital, would connect the principal cities and towns in the six provinces, ninety-three cities and towns being named in the concession; to complete the construction from Guane, in the western end of the island, to Santiago, in the east, in the two first years, and from Santiago to Baracoa, in the extreme eastern end of the island, in the following year.

This company began operations on September 10, 1910, taking over the old Havana Telephone Company's system, which continued to give service until October 17, 1910, when it was almost completely destroyed by a cyclone.

The work of construction and extension was taken up and continued with the utmost energy, and the growth from that time on has been steady.

The importance of this modern system in the development of Cuba in its business and social activities, is beyond calculation. Its usefulness is felt more and more every day, and will be greatly enhanced when, as is expected to occur within a reasonable length of time, the Cuban telephone system is connected directly by a submarine cable between Havana and Key West, with the United States. Construction work is being carried on as rapidly as is consistent with the conservative policy adopted by the company.

Concrete Poles Rejected

Concrete poles, after a thorough trial, have been officially rejected by the New York Telephone Company, it is said. Many of them in rural districts have been removed and wooden poles of the old type substituted, and it is the further policy to use only wooden poles for new work and renewals. Certain impracticable features of the concrete poles and an added element of danger are given as the reasons for the change in policy.

It is explained that concrete poles must be reinforced with an iron core or some similar contrivance. This, while strengthening the pole, becomes a conductor for electricity and acts as a source of danger to men. Especially is this the case when the telephone wires become crossed with high tension wires. Further, all the points of attachment for side arms and wires must be anticipated when the pole is built. This is a virtual impossibility, poles sometimes being reset from their original position, the changed conditions making new attachments necessary.

The first expense of the concrete poles is far more than the cost of wood poles but on account of their virtual indestructibility, on the basis of annual length of life, the concrete pole is much cheaper.

The turtle lays forty eggs and lets no one know about it; the hen makes a great fuss when she lays one, because it is a good egg. If you can do one thing very well indeed, don't be bashful about it.

My First Visit to Japan

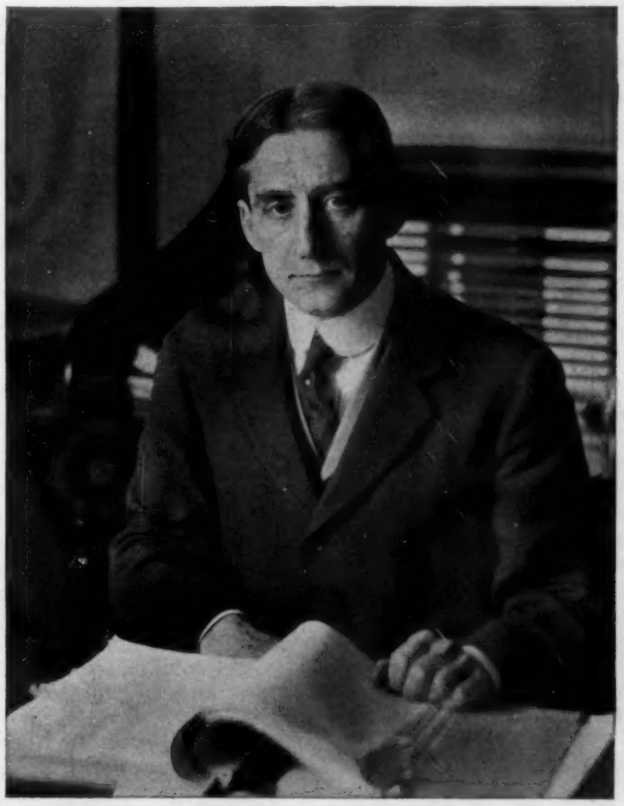
Written on Board the "Empress of Asia," and Presented Here by Courtesy of "Western Electric News"

By GERARD SWOPE

SEVEN months have passed since I left my associates in the Western Electric Company, and so much has occurred in this time that it is difficult to single out, for a short article, those things of greatest interest.

Even this week has been very interesting, for although the route of this ship is far north, just south of the Aleutian Islands, still the weather has been mild and pleasant. Most of the days have been clear and full of sunshine, and on the whole the seas have been smooth. But furthermore, the week has been interesting by reason of the fact that it has consisted of eight days, an unusual experience in my life. The day after Wednesday, December 5, was not, according to our usual experience, Thursday, December 6, but was Meridian Day, without a date, and the day following was Thursday, December 6. It is hard to realize that we have had a whole day extra, but that only makes up for the day we lost on our trip to the Far East. However, a day lost is not the unusual and interesting experience that an entire day gained is. Before Meridian Day, when it was Wednesday with us, it was only Tuesday night at home, while after it, we are living in the same day as our friends at home, and it begins to make our home-coming seem more real.

Of course, the first and greatest impression that Japan makes upon one from the United States, and particularly upon one who is interested in commerce and industry, is its very rapid development. Not only has it been rapid, but intensive. Japan is a small country, with comparatively a very large population—about the size of Illinois, Indiana and Iowa, with a population more than five times as many as in those three states. Furthermore, only a small part of the land can be used productively because of the many mountains. The arable land is intensively cultivated, and in no country have I seen human beings work harder and longer than in Japan. The natural resources are not great, but notwithstanding, Japan has and is developing its industries remarkably. It seems unbelievable that less than fifty years ago Japan was still in the Feudal Age, and that in this short time it has completely changed and come into the first rank of nations commercially and industrially.



Gerard Swope, Vice-President and General Sales Manager of the Western Electric Company, upon whom the Emperor of Japan Conferred the Decoration of the Fourth Order of Merit of the Rising Sun.

Before 1868 Japan had been an absolute monarchy, with the emperor a symbol only, the real power being in the hands of a powerful family, the head of which acted as regent (shogun), who always held before the people the idea that the source of his power was the emperor. The organization of the upper classes was entirely a militaristic one, and all through the country the ideal of the submission of the individual to the over-lord was the chief and central characteristic. When, then, the country was opened to western influences, the change took the form, not of rebellion to the emperor, but of rebellion to the regent, and the restoration to the emperor of his full powers, without any intermediary.

Japan was most fortunate at that time in having able men, both in the persons of the emperor and his advisers. They were broad-minded and masterful in the policy they adopted, and during the ensuing years Japan consistently followed the course laid down by them.

The kind of government that Japan has is much easier for us to understand if we remember that it is the development of the old ideals of Japan, where the ideal of the emperor or the state is uppermost, and the duty of the individual to the emperor or the state is all-embracing and clearly understood and accepted by all. In the legends of Japan and their dramas this characteristic is constantly seen. It is still taught in the schools, and is followed with the greatest interest and absorption by the people. It leads to a high ideal of public service, where it is considered a great honor to serve the state, and where service to the state is given willingly and conscientiously. This is seen not only in war, as it was so dramatically at Port Arthur, but also in civil life, where the best men serve the emperor gladly and loyally.

There is an old saying, by one of the early emperors, which seems to me significant—"The well-being of the people is the well-being of ourselves," and Ieyasu, the first Tokugugawa shogun, said: "To assist the people is to give peace to the empire—the people are the foundation of the empire."

The question often occurred to me—Has the well-being of the people in Japan increased by the adoption of Occidental civ-

ilization over what it was prior to 1868? After observation for some months, and after talking to many people, my own conclusion is that it has. Today there is greater security of life; there is a greater variety of food, shelter is assured, and both are provided with greater certainty and less exertion; and the liberty of the individual among the common people is greater. In addition, primary education is provided by the state and made compulsory for all. The people, especially the children, are clean, healthy, happy and contented. They are orderly and law-abiding, and there are few cities in the United States with so few police in proportion to the population as Tokyo or other cities of Japan. The people are kindly, especially to the foreigners. Even in small towns and in the country one is greeted by a smile and a cheery word by children and elders.

What is so interesting to me is the fact that in Japan we have a nation of upwards of sixty millions of people, who have, within the lifetime of men still living, adopted an entirely new civilization, a change the like of which has, as far as I know, never before been made on such a scale in the history of mankind. From having no foreign intercourse, they now have alliances with foreign nations, intimate intercourse, and their foreign commerce is large. From having but small hand industries, they now have large industries, using machinery to a great extent, and also manufacturing it.

Although you may expect from me figures and statistics, I am not going to give any, but simply will try to bring before you the salient impressions. If you are interested there are many books written about Japan and its rapid development which make interesting reading.

Another matter that surprised me was the absence of soldiers from the city streets, especially as I recalled the early traditions of Japan and the successful wars that it has waged. Although Japan has a comparatively large standing army, even in these times, its streets are freer from soldiers than the streets of London or of Paris before the war.

I was one of the three unofficial Americans who were fortunate enough to be present in June at the opening of the Diet by the emperor. The floor of the House of Peers was filled by members of both Houses of the Diet, standing, all in their appropriate uniforms and decorations. The galleries were filled with the diplomatic representatives of the foreign governments, also resplendent in their uniforms and decorations. The cabinet was present, headed by Marshal Count Terauchi.

On the entrance of the emperor and during the reading of his message, and indeed until his departure, the silence and reverential attitude of the entire assemblage were most marked. It was indeed a most impressive and illuminating ceremony.

I saw the emperor again on the occasion of the military review, on his birthday. He was driven through the streets in his carriage, with the imperial body-guard following, and the attitude of the people was clearly one of great reverence. At the review he first rode around the large field followed by his staff, and afterwards the soldiers—infantry, artillery and cavalry—marched by the reviewing stand, which gave me a good opportunity to see thousands of Japan's sturdy soldiers at close range.

At the chrysanthemum party in November, given at one of the palaces in Tokyo, I again saw the emperor. On this occasion he and the empress, accompanied only by civil officers and servants of the imperial household, made a tour of the garden, while their two thousand guests stood grouped on one of the lawns and bowed low as he passed.

Early in the seventies the government sent out men to study the political and judicial, the civil and military systems of different countries. It sent out young men to be educated in European and American schools, in order to bring home the results of their study and observation.

In 1890 the Japanese government sent a commission to investigate telephone systems in Europe and America, of which Dr. Saturi Oi was the head. Dr. Oi was then the chief engineer of the Ministry of Communications. Of all the men whom I met, I know of none whose intellect and character I more respect and admire than that of Dr. Oi. On Dr. Oi's return, as a result of and in line with his report to the ministry, the telephone development began.

In Japan the Ministry of Communications (Teishinsho), of which his excellency, Baron Den, is the present head, supervises all means of communication of the empire. This includes the postoffice, and even postal savings banks, the railroads, water transportation, telephone and telegraph, wire and wireless.

The telephone system in Japan consists of approximately 250,000 subscribers and toll lines, connecting the principal cities. Unfortunately, because of the great need and pressure in other directions, as much money has not been spent in the development of the telephone as Japan's own people and the heads of the Ministry of Communications would have liked. As is often the case with each of us in our own lives and, of course, even more so with large corporations and with governments, many things that we should like to do or see done must either be done in part or postponed because of greater necessity and pressure in other directions. There are in Japan upwards of 200,000 people who have paid 15 yen ($7.50) and made application for a telephone, and no doubt thousands of others desire the telephone but have not made application because of the discouragement of so long a waiting list. The possession of a telephone in Japan is a valuable asset, and is considered as such on the books of many companies. Telephones are not given up but are transferred and sold by one subscriber to another for sometimes as much as 1,000 yen ($500).

But the great thing is that Japan recognizes the aid to commerce, industry and civilization that the telephone is, and this last summer the Diet passed a bill approving the expenditure of 100,000,000 yen ($50,000,000) over the next eight years in the development of the telephone facilities of the empire. This will go far towards meeting the need, but with Japan's rapid development in industry and commerce it is confidently expected that before this period has elapsed an even greater sum for telephone extension will be needed.

The successors of Dr. Oi as chief engineer of the Ministry of Communications have been men of distinction—Dr. Asano, professor of the Imperial University in Tokyo; Dr. Igarashi, and now, Mr. Urata, the present chief engineer. It was my good fortune to meet these gentlemen, and also their associates, many of whom have traveled and studied in America. They are all most appreciative of the opportunity that has been offered to them by the Western Electric Company and the Bell System in the United States, and the assistance we have at all times offered. The business of the Western Electric Company or Bell System is not solely commercial or industrial. We are connected with a service which is constantly tending to bring people closer together. Therefore, we are glad to put the results of our work at

Mr. Swope and his guests at a dinner given by him in Tokyo. Among those in the picture are Dr. Oi, formerly Chief Engineer, Bureau of Post, Telephone and Telegraph of Japan; S. Urata, the present Chief Engineer; Dr. O. Asano, Professor of Electrical Engineering, Imperial University of Tokyo, and K. Iwadare, Managing Director of the Nippon Electric Co., Ltd.

the disposal of those who would put these facilities in the service of an ever-increasing body of people.

I hope, with the rapid progress of our work in the United States, an even larger number of Japanese and other foreigners will visit us, and, as in the past, it will be not only our duty but our pleasure to afford them every facility for taking advantage of the progress we have made.

The record of our own country in its relation with Japan has, on the whole, been good, dating from the visits of Commodore Perry and the first treaty made by Townsend Harris, which won the respect of the Japanese in later years because of its eminent fairness. In those early years a customs tariff was fixed by treaty between Japan and other governments. Later, when Japan wished to have these treaties modified, the United States was willing to accede to Japan's desires, although some other nations were not. It was not until Japan had shown that it had so completely assimilated Western ideas, by its increasing strength and, later, by its victory over China in 1895, that modifications of the treaties between Japan and other nations were finally agreed to.

The Nippon Electric Company, Limited, is our associated company in Japan. The character of its business is much the same as our own. It manufactures telephone apparatus, switchboards and cable, and also distributes and imports electrical supplies. Traveling in Japan and Korea I often saw evidences of its activity in telephone apparatus and electrical supplies bearing its name, or our own specialties brought from the United States and bearing the familiar script letters of the Western Electric Company. It will interest you, as it did me, to think that some of the apparatus made in Hawthorne and some of the best electrical devices made in the United States may be found in service so far from their point of origin. The Nippon Electric Company was the first company in Japan representing co-operation between American and Japanese citizens. It has had over eighteen years of uninterrupted activity, has been growing and has been successful, and has now a force of approximately 1,000 people. It also has under way at the present time new buildings, which will double the capacity of its plant.

In all this time it has been under the management of Mr. Kunihko Iwadare, who was the first manager of the business, and is still the managing director of the company. In America, in Europe or in Japan, a business man with higher ethical standards it would be hard to find.

There are few of us who would not agree on the broad principle of co-operation—the difficulty is always to find ways and means to co-operate. A concrete instance, such as this, is the best way to begin, and by the ever-broadening influence of more of such concrete instances of working together, the friendship of peoples will be more assured.

While in Japan I met all of the original shareholders of the Nippon Electric Company, Limited, all of whom are still interested in the business, who have been satisfied with the results of the business, and who appreciate and value the relations their company has had with the Western Electric Company.

Before 1899 none of these shareholders had any actual experience in co-operation with foreigners. Now they have had eighteen years of successful dealings, and have satisfied not only themselves, but have told others with whom they come in contact, of how satisfactory this relationship has been.

We, on our part, can tell our friends in America how entirely satisfactory our co-operation with our Japanese associates has been. This much mooted question of co-operation between Japan and America is going to

depend largely upon the results of more concrete instances such as this. It was constantly borne in upon me that a friendship or a good relation between individuals and peoples, to be continuous through a long period of years, must be founded on mutual respect, confidence and fair dealing.

Chicago Company's Report

The Chicago Telephone Company reports net income of $2,447,988 as compared to $3,414,585 in the previous year. After paying the common dividend the company shows a deficit of $78,001 as compared to a surplus of $1,193,585 in 1916.

The problems of the company were those of practically all untility corporations during 1917; gross business showed a material gain but an extraordinary increase in operating expenses reduced net. More than $2,500,000 was charged off for depreciation.

Commenting on the showing President B. E. Sunny says:

Practically all utility companies have suffered severely during the year just closed because of greatly increased costs for salaries, wages, and materials. This company has been no exception to the rule. Indeed, with 14,700 men and women on the pay roll, all under the pressure of the high cost of living, maximum increases in compensation were necessary and inevitable. Such increases, ranging from 7 per cent to 13 per cent, were made quite generally, and, in addition, a cash bonus of $545,000 was paid out of surplus.

"Prices of materials of every description used in the service increased from 5 per cent to 50 per cent over the high prices prevailing at the beginning of the year.

"Taxes were $1,400,000, or more than 6 per cent on the gross revenue. The increase over the preceding year was $250,000. The operating expenses are divided into forty different accounts, and thirty-seven showed an increase over the previous year, the increases in some cases amounting to between 40 and 50 per cent."

The income account for the year ended December 31 compares:

	1916.	1917.
Operating revenues	$19,672,718	$21,543,913
Operating expenses	14,031,547	16,552,825
Net operating revenues	$ 5,641,171	$ 4,991,088
Deductions (taxes and uncollectible)	1,228,055	1,432,450
Total operating income	$ 4,413,115	$ 3,558,637
Net nonoperative revenues	96,849	107,580
Total gross income	$ 4,509,965	$ 3,666,218
Deductions (rent, interest, etc.)	1,095,379	1,218,220
Balance net income	$ 3,414,585	$ 2,447,998
Dividend appropriations of income	2,220,000	2,520,000
Other propriations of income	1,000	1,000
Balance corporation's surplus	$ 1,193,585	*$ 73,100

*Deficit.

"The construction program of the Chicago Telephone Company for the current year," Mr. Sunny says, "will be curtailed in obedience to the federal admonition to avoid expenditures that are not required by the prosecution of the war or of vital importance to the necessary industries of the country." He points out, however, that there is a large amount of work under way that must be finished, and this, together with the additional plant actually required and not prohibited by federal expression on the subject, will call for expenditures of about $5,000,000.

In 1917 the value of the Chicago Telephone plant increased $9,000,000. This represented additional land, buildings, conduits, cables, switchboards and other telephone products. There was expended for maintenance during the year $3,360,000. Mr. Sunny asserts that the property of the company is in the best possible condition throughout.

On January 1, 659 telephone employes were in the service of the country. Out of a total of 4,705 men employed 1,675 were of draft age. The company asked for deferred classification for many of these men, performing duties of great importance to the maintenance of the telephone service, whose places cannot be satisfactorily filled, on the ground the telephone system is an essential part of the machinery for carrying on the war.

During the year 111,000 new telephones were connected and 77,000 disconnected.

Labor Fights in Self-Defense

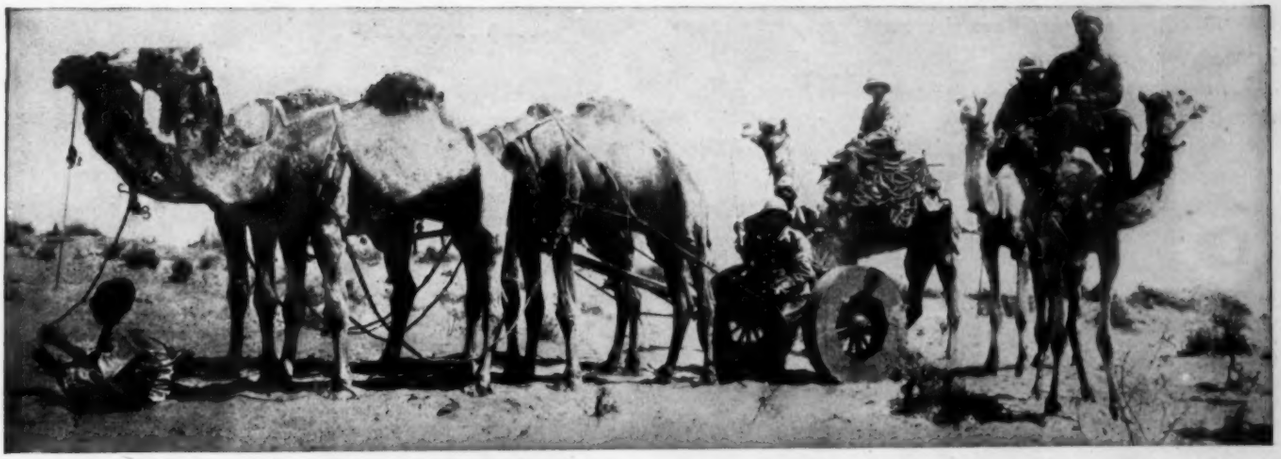
The series of explosions and fires that have been wrecking American steamships, docks, factories, bridges, railway trains and grain elevators affords the American workingman a most practical reason why he should lend every ounce of strength and energy to the winning of the war against the military autocracy of the central empires. To him and his immediate interests this is a war of self-defense—a war against a system that contemplates his undoing.

"There is not a question in the world that the attempts to destroy American industries are a part of the German war propaganda," said a great labor leader recently, "and it should be the duty of American workingmen to aid their government in every possible way to wipe out this sort of propaganda. Every one knows that the kaiser's agents are busy in this nation with torch and dynamite, not only for the purpose of hampering war activities, but for the purpose of crippling industry in general. Purely in self-defense the American workingman must fight back to the best of his ability if his source of livelihood is to be preserved.

"Many of the loyal American workmen have come from Europe within the last few years; many others are the sons of fathers and mothers who came to this country many years ago either to improve their condition or to escape military persecution. America offers good wages and the privilege to work unhampered—good wages, plenty of work, liberal laws and equal opportunities to all. Moreover, there was no forced military service in the United States until Prussian militarism threatened our very existence.

"Now that this country has set about to defeat the sinister purposes of Prussianism, the American workingman should realize that every dollar he lends to his government brings nearer the day when European influence will no longer be able to make itself felt in this country by threatening the existence and liberay of labor in general.

"German money, as well as German influence, is being used in the work of destroying American property. German statesmen want the United States crippled industrially and they don't care whether the American workingman starves to death while they are crippling our industries. Liberty bonds offer the American workingman not only a safe and profitable investment for himself but a weapon to combat the unholy methods of the foreign slave drivers. American labor has done its part in aiding the Government at Washington in the past and it should be even more willing and ready to lend support in the future."



The ancient swift messengers of the desert hauling a chariot used to lay tele phone wires. The Israelites took forty years to go from Egypt to Palestine; the modern railroad enabled the British to cover the distance in eig hteen days and recapture the Holy City; the telephone now unites the countries of mystery and of sacred story instantly.

Fords, Tractors and Other Chariots

A Bit of Sequel to the Truck and Trailer Story of Last Month

SOME FORD COST RECORDS

By W. D. Hickin
General Manager, Traverse Bays Telephone Company, Central Lake, Michigan.

YOUR articles on automobiles and motortrucks should be of much interest to telephone companies, and as the information must be compiled principally from the records and data of operating companies I will give you the facts and figures on our machines.

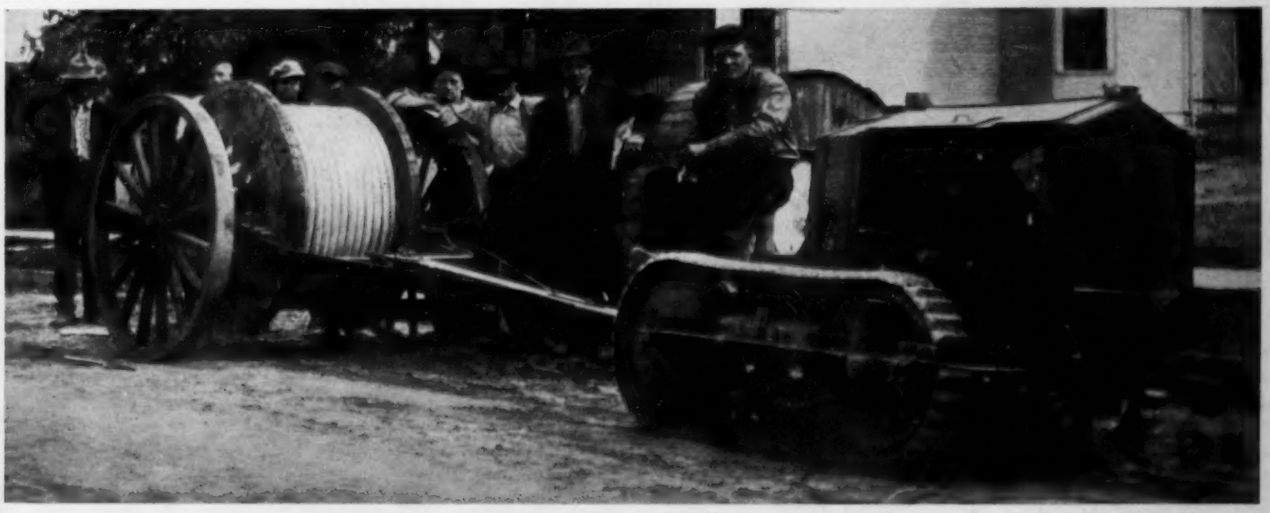
We used a motorcycle for three years, but on account of poor roads and small load capacity changed to the use of a Ford roadster. Some of our objections to the use of a motorcycle might have been overcome had we used a side car, but even with one we did not think we could carry the load required. At the time of the purchase of our first machine we were taking care of all the work on five exchanges, about 625 telephones, from the head office of the company, the services of two men being required. The territory we cover is about 30 miles long and an average width of 12 miles. A lake about eighteen miles long and two miles wide lies in this area and often increases the length of trips.

The first Ford roadster was purchased on June 23, 1915, and sold on April 21, 1917, but during seven months of this time was not in use on account of snow. The regular body was used as we found plenty of room to carry tools and material.

DATA OF MACHINE NO. 1

DATA OF MACHINE.

Mileage.	Gas.	Cost Gas.	Miles per gal.	Oil.	Cost Oil.	Repairs	Sundries. Tires.	Total Cost.	Cost per mile.
22,909	1495	$261.90	15.3	74	$29.60	$197.62	$180.06	$669.18	.0292
22,909	1495	261.90	15.3	74	29.60	197.62	180.06	965.99	.0421



No. 3 Caterpillar Tractor Used for Pulling in Underground Cable at Great Falls.

The first figures show the total expense without interest or depreciation. The machine was sold for $175, making a loss by depreciation of $243.20, and interest charges at 7 per cent were $53.61. The second cost figures have this expense included. We then bought another Ford roadster on April 20, 1917, which is still in use, and on June 1, 1917, a second one, and transferred one man and machine to another exchange, which saves many long drives. Snow which came December 7, 1917, made the roads impassable for automobiles and figures given are for machine No. 2 from April 20 to December 7, and No. 3 from June 1 to December 7. No interest or depreciation is included.

	Mileage.	Gas.	Cost Gas.	Miles per gal.	Oil.	Cost Oil.	Repairs Sundries.	Tires.	Total Cost.	Cost per mile.
No. 2	8342	577	$133.69	14.4	12	$6.35	$44.95	$94.03	$279.02	.0334
No. 3	3689	263	58.06	14.0	10	4.38	44.44	2.85	109.73	.0297

The lower mileage on the new machines is partly due to the use of a two-wheel trailer, and also we had more rain than usual last season and consequently heavy roads. The higher cost per mile is due to the higher cost of gasoline and tires. Machines Nos. 2 and 3 are equipped with 30 by 3-inch tires, front and rear, and we find, on a roadster, that they stand up as well as a 3½-inch tire, besides running easier on sand roads, the rear tire not being required to make a wider track than the front. There is an additional advantage on account of only one size of tire and casing when we wish to carry an extra tire.

Except in winter, when we cannot run the machines on account of snow, we seldom hire a team for any purpose. With the trailer (which we made at an expense of 20.99), we haul all poles and material from the warehouse and yard to the line and can carry a crew of eight men to and from work.

TRACTORING UNDERGROUND CABLE

From the Denver "Mountain States Monitor."

TRACTORS have been used in countless ways and put to various uses, but the Great Falls district of the Mountain States Telephone and Telegraph Company has set a new record in the use of the gasoline horse. Some time ago when pulling in underground cable with a White truck and not having very good luck, a suggestion was made by someone to try a small caterpillar tread tractor that was being demonstrated by the Western Motor Company.

No sooner said than done. The motor people were approached on the subject and not only agreed to furnish the machine, but at no cost to the telephone company. It was further agreed to take some pictures of the tractor in action for future advertising purposes. The accompanying pictures at the foot of the preceding page give a good idea of what the little machine can do in the actual work of pulling in 600-pair cable, as well as small sizes. No trouble of any kind was experienced and blocks of cable were pulled in in a very few minutes.

The Teague Directory Case

By F. B. MacKinnon

Following is a copy of a letter received from the solicitor of the Post Office Department relative to the Teague Directory and Calendar Company of Sherman, Texas.

As stated in the letter the Teague Company has stipulated with the Post Office Department that it will discontinue its telephone directory campaign.

If any company receives further communications from the Teague Company or from anyone acting for it or under its so-called copyright I would appreciate it if such letters be forwarded immediately together with the envelopes in which they are received.

It is our hope to have no further trouble with the Teague Company, that the prompt action of the Post Office Department has put a stop to this ridiculous scheme.

To F. B. MacKinnon, Vice-president, United States Independent Telephone Association, Washington, D. C.—In answer to your letter of the 8th instant, with enclosures, you are advised that the Teague Directory and Calendar Company of Sherman, Texas, was recently cited by this office to show cause why a fraud order should not be issued against it, and was represented by counsel at the hearing before the Department. After a careful consideration of all the facts in the case and in view of the filing by Mr. Teague, the president of the company, of an affidavit setting forth that the business complained of has been discontinued and will not be resumed by him, it has been decided that further action in the matter by this office is not necessary at this time.—(Signed) W. H. Lamar, Solicitor.

Representative J. P. Buchanan of Texas has also been investigating the claim of the Teague Directory and Calendar Company of Sherman, Texas, to the exclusive right in the United States to publish numerical and alphabetical telephone directories.

The Georgetown Telephone Company was advised by the Teague company that it would proceed against them for infringement of copyright if it issued a directory without paying a royalty.

Upon the request of the Georgetown company Congressman Buchanan took the matter up with the register of copyrights of the congressional library who issues all copyrights, and received the following report, which will be of interest to all telephone companies:

Arthur M. Teague of Sherman, Texas, registered on December 3, 1917, a book entitled "the A. M. Teague Numbered Alphabetical, Classified Telephone Directory." The registration was duly made. The book is compiled for the town of Denison, Texas, and this claim is defined and limited in Section 1 of the copyright act to include the "exclusive right to print, copy, publish the copyrighted work."

Deposited and registered, that is the directory for Denison, Texas, and does not imply any conclusive right to compile telephone directories of similar character either for that town or any other.

There is nothing, therefore, to support the claims made in the circular letter, nor to justify the threats contained in the document. The matter has come to the attention of the Department of Justice and also has been submitted to the Postoffice Department and that department proposes to take action. The law in the matter is well established by many decisions and it does not seem to call for mandatory legislation but some interposition from authoritative quarter to put a stop to the unreasonable demands.

Following the receipt of the above report Representative Buchanan said he would not press for consideration any new legislation pertaining to copyrights, but will insist upon a thorough investigation by the department of justice.

Cheeriest Voice in the Hotel

K. C. B. IN YE TOWNE GOSSIP, CHICAGO EXAMINER.

I DON'T know who she is.
OR WHAT she looks like.
OR IF she's married.
OR ENGAGED.
OR LOVES anybody.
OR ANYTHING.
BUT I do know.
THAT WHEN I'm in my room.
AT MY hotel.
AND I want another pillow.
OR A vase.
TO PUT flowers in.
OR A valet.
TO PRESS my clothes.
OR SOMEONE.
TO GET the laundry.
OR WHATEVER it is.
I JUST pick up the phone.
AND SHE answers.
AND I tell her.
WHAT I want.
AND IT'S strange.
BUT SOMEHOW.
I CAN hear her smile.
WHEN SHE says.
"ALL RIGHTEE,
"RIGHT AWAY."
AND OF course I know.
THAT SHE gets paid.
FOR BEING there.
AND FOR doing things.
FOR THE guests.
BUT I'M quite sure.
SHE DOESN'T get paid.
FOR THE cheer.
SHE PUTS into her voice.
AND THE happy way.
SHE SAYS: "All rightee."
I MEAN.
SHE DOESN'T get paid.
IN MONEY.
IT JUST comes back in cheer.
THAT GOES over the phone.
TO HER, and I know.
WHEN HER day is done.
AND SHE'S tired.
THAT IT doesn't matter.
BECAUSE SHE'S happy.
AND SOMEWHERE.
IN A big city.
THERE ARE other folks.
WHO ARE a little happier.
THAN THEY might have been.
IF IT hadn't happened.
THAT A voice.
HAD SAID "All rightee."
AND HAD smiled at them.
OVER THE phone.
I'VE TOLD her boss.
THAT THE cheeriest thing.
THEY'VE PUT in my room.
IS THE telephone.
AND I'VE told him why.
I THANK you.

The Farm Telephone

By the systematic use of our telephone in a business way we have made it one of the most valuable pieces of equipment on the farm, says a writer in *Farm and Fireside*. When we have anything to sell we call up the buyers and ask all who are buying that particular thing to come and see it and make an offer. Here the phone saves trips to see these buyers, and of course the highest bidder gets the produce. Buyers usually prefer to deal with farmers who have telephones, as I learned from the following incident:

We had thirty tons of No. 1 timothy hay for sale, and one buyer offered a fairly good price. But we felt that the hay was worth 75 cents a ton more, so we held it. About an hour later he called up and asked: "If I bought your hay, could you send over three loads this afternoon and the balance as soon as possible?" We replied that we could.

He explained that he had just received an order to be shipped that week and said: "I'll take the hay at your price. With that thirty tons I'll have just enough of the right kind of timothy to fill the order. Some other people have hay that I could get cheaper, but they have no telephones and I have no time to go and see them." So thanks to the phone we made $22.50 more on that deal.

One day while we were hauling hay the team became overheated and, on reaching home, one of the horses began to have chills. We located a veterinarian over the phone and described the symptoms. "That horse has acute pneumonia," he said, "and if he is to be saved, the work must be done within an hour. I have so many calls that I can't possibly get to your place before noon tomorrow, so you will have to do the work. Dissolve a drachm of quinine in a pint of whisky and give it to him as soon as possible. You must get him to sweating. Pile the blankets on him and keep him blanketed and out of drafts after he starts to sweat. I'll come as soon as possible."

Rules of 1886

This telephone is private property, and, by contract, only for the use of subscribers. Read these rules before using your telephone:

1—In talking, stand six inches from the transmitter and talk in a natural voice.

2—To call, ring the bell and await the answering ring; then remove the telephone and tell the operator at the central office what you want; then hang up your telephone and proceed to ring up the party wanted.

3—When your bell rings, always give an answering ring.

4—Always hang the telephone on the hook when not in use, large end down.

5—After calling for a connection always stay at the telephone until you get it.

6—Call only by numbers. Always give your own number first.

All switches to Old Tacoma station and Tacoma Mill company office, 25 cents.—A. C. SANDS, Manager.

These rules are taken from the telephone directory in use in Tacoma, Wash., in the year 1886. The company had sixty subscribers at that time, only five of which had residence service.

Licensed by Telephone

Closing the city hall in Haverhill, Mass., one recent afternoon would have proved disastrous for Patrick J. Kelleher and Miss Katherine M. Condon, both of 22 Union street, who were to be married at 5 o'clock, had it not been for the telephone.

In the afternoon Mr. Kelleher looked for his marriage license but he was without it. He made a wild rush for the city hall, but all in vain, for when he arrived there he found it closed. The city clerk's office was closed, the office girls were "somewhere," and no one knew where Assistant Clerk Quimby was.

After half an hour of fruitless searching for Mr. Roberts someone told Kelleher he was at the beach. Mr. Kelleher got in touch with him at the beach and he (Roberts) later got in touch with Rev. John J. Graham, P. R., of St. James' Church, and gave permission for the wedding. They were married in the parochial residence by Rev. Fr. Graham in the presence of relatives and friends.

The First Exchange in Europe

The Telegraph and Telephone Journal, London.

BY W. H. GUNSTON.

The death of Mr. James G. Lorrain (one of the pioneers of telephony), which we greatly regret to record, recalls the controversy which took place in the *Electrical Review* at the end of 1909 concerning the opening of the first telephone exchange in Europe. It was singular that an event which occurred so recently as 1879 should be a matter for doubt, and the *National Telephone Journal*, whose editors were in close touch with several pioneers of the telephone world, compared the case with the uncertainty which existed as to the side of Whitehall on which Charles I was beheaded. Huxley, in his essay "On the Value of Witness as to the Miraculous," adduced that uncertainty in an age when the printing press was well established and prolific, and in a case where eye witnesses were numerous and public opinion deeply stirred, as a proof of the caution with which historical evidence must be accepted even under favorable conditions.

"Still stranger is it," commented the *Journal*, "that there should be any difficulty in determining accurately an event which occurred in an age when everything of importance is instantly recorded in hundreds of newspapers. The first exchanges, however, unlike the earliest railways, were not opened with the accompaniment of flags, brass bands, banquets and speeches, although as soon as the importance of the telephone began to be appreciated the installation of new exchanges in large towns was sometimes signalized by public ceremonies. The part which the supposed 'scientific toy' was to play in civilization was not appreciated in the year 1879."

Another difficulty which confronts the investigator is that in some cases at least there was probably no formal opening of the first exchange. At some period between the time when work was first commenced on the switchboard and the time when a fair number of subscribers enjoyed telephonic intercommunication, there would be a stage when half a dozen subscribers were receiving bona fide exchange service. Hence the first of these dates would be too early and the second too late to be fixed as the actual date of opening. We have been at some pains to collect evidence on the subject, and what is indisputably established appears to be that in September, 1879, exchanges were working in Coleman street and Lombard street, London, and in Faulkner street, Manchester, with not more than about 30 subscribers between them, and that exchanges in Liverpool, Wolverhampton and Sheffield followed in quick succession. Mr. J. G. Lorrain is of opinion that he had the Manchester exchange working in the July of the year mentioned, whilst Mr. Poole would put it at some date in September; Messrs. Fletcher and C. J. Phillips can testify that the Coleman street exchange was working in August, 1879; and Mr. J. E. Kingsbury produces evidence that the Lombard street exchange was publicly opened in September, but has no doubt that service was given for some time previously.

All the gentlemen named were engaged in telephone work in 1879, but nothing decisive emerges from the inquiry except that that year was a historic one for European telephony.

Electric Industries reprints Mr. Lorrain's "Pioneer Story" from its columns of the year 1902, and from these we quote the following:

"The Manchester exchange was the first telephone exchange in Great Britain, and indeed in Europe. The switching apparatus consisted of a Williams' 'standard' switchboard, as it was called, and a separate operating table. Two operators were required to work 75 lines. One sat at the table to receive the calls and shouted them out to the other operator, who plugged the lines together at the switchboard. The noise in a switchroom fitted with a number of such operating tables may be imagined. It soon led to the abandonment of such apparatus in large stations.

"Almost immediately afterwards the London exchange was started, Mr. Ormiston and Mr. Fletcher acting as engineers. About three weeks later I went to Liverpool and started the exchange there; and this was quickly followed by an exchange started in Sheffield by the late Mr. Tasker and by one in Wolverhampton. About this time Mr. Edison's representatives started the formation exchanges in this country with, I think, the 'Fitch' form of Edison carbon transmitter and the Edison 'motograph' receiver.

"In August, 1879, a company—the Lancashire Telephonic Exchange, Limited—was formed to take over the Manchester and Liverpool exchanges; and that company subsequently, in 1881, transferred its business to the Lancashire and Cheshire Telephone Company, Limited.

"In October, 1879, I started a telephone exchange in Edinburgh, and when I was able to show it in working order some of my friends joined me and we formed the Scottish Telephonic Exchange, Limited, with a paid-up capital of £10,000. Progress was comparatively slow until Mr. Faithful Begg took an interest in the company. He obtained for us permission to connect the Edinburgh Stock Exchange, and that led to our getting nearly all the stockbrokers as subscribers.

"In planning the Edinburgh exchange I made a good many departures from previous practice. Instead of taking the lines of all our subscribers to one central station, I put up four central stations, three in different districts of Edinburgh and one in Leith, and these I fitted with the Jones operating tables. This central switching apparatus differed considerably from that of the 'Williams' type used in the English exchanges. With the Jones system each operator was seated at a separate table fitted with 50 lines and arranged in such a manner that flexible connecting leads could connect any two of the tables. A very much more rapid service could be given by this means; and there was no shouting in the exchange room. I also adopted magneto callbells for the subscribers, instead of battery call-bells as had hitherto been the practice. Some of these were constructed on the old 'thunder-pump' principle."

Mr. Lorrain acted as consulting engineer in the erection of the Dundee and Belfast exchanges, and specified and dispatched plant for the pioneer exchanges in Bombay, Calcutta and Madras in 1880, assisting also in the erection of exchanges in Milan and Bolonia in 1884. Altogether it will be seen he played a great part in the pioneer work of telephony.

Unless more definite evidence can be adduced in favor of London, we must assume that Manchester possessed the first telephone exchange in Europe. But as already observed it is strange that an element of doubt should exist concerning so significant and so recent an event.

Old Tracing Cloth

The drawing rooms in many plants contains old tracings, on tracing cloth, which are of no further use. Any laundry can wash and iron these so that the cloth becomes available for bandages. The Shartle Brothers Machine Company, Middletown, Ohio, has offered to wash such tracings in its shop laundry and turn them over to the Red Cross.

Intangible Values and War Tax

Reproduced by Permission from the February Issue of "Industrial Management"

BY CHARLES M. McKAY

An analysis by means of illustrations of the war tax on business to show how important are the problems surrounding the determination of the intangible assets. The author quotes a decision of an Iowa court and explains the method so established for determining the monetary equivalent of these assets. Mr. Charles McKay has been engaged in telephone engineering and appraisal work since graduating from Cornell University in 1906. He has been associated with the New York Telephone Company, Henry Floy, and the McCall and Clark Company. At present he is affiliated with the engineering firm of McMeen and Miller, devoting the major part of his time to problems of appraisals.—INDUSTRIAL MANAGEMENT.

IN October, 1917, Congress passed an act that will have a far-reaching effect upon industrial interests, the War Revenue Tax Act. This act owes its inception to a most laudable idea and it is far from the purpose of this article to criticize Congress—or any department of the Federal Government—in its efforts to raise the money necessary for the successful prosecution of the war with Germany. Every reader is unquestionably imbued with the same spirit—a spirit of helpfulness, regardless of cost or of personal sacrifice. However, when a legislative body, after six months of deliberation, passes a bill which falls so far short of the purpose for which it was ostensibly designed, one may be pardoned a little curiosity as to its possible effect upon the various interests which it involves.

The act of October, 1917, provides for a strict censorship of the earnings of industrial concerns, and further provides the right of taxation on all earnings which, under the terms of the act are deemed to be in the nature of excess profits. So far so good—no one criticizes the right, moral or legal, of a war tax on excess profits—providing that they really are excess profits.

Under the terms of this act industrial organizations, whether they be incorporated or "personal" companies, are not permitted to capitalize intangible assets as a part of the base used in computing taxes unless these intangible assets have been actually purchased with cash.

It is a well known fact that many of the smaller industrial companies—and for that matter many of the larger ones—have a comparatively small amount of capital tied up in actual physical plant. The physical plant represents but the bare bones of the business, and in the case of many companies, unless imbued with life it is worse than useless. "Life" in the case of an industrial organization means business, and business values are always built up of such items as goodwill, going value, contract values and patent rights.

The intangible factors in industrial business contribute heavily to the earning of profits. They are one of the props of success. These factors include competition, patent rights, reputation for integrity, personnel of the directorate, trade names, market conditions, pending orders, location, publicity, credit and annual earnings. An Iowa court has declared that the most satisfactory manner of determining the monetary value of intangible assets is to take the average yearly earnings over a period of three or five years of uneven earnings as a basis. From this average deduct the amount of interest on the average capital employed during the same years, figured at the rate of seven per cent per annum. The actual surplus profits thus ascertained may then be multiplied by some proper factor to determine the value of the intangible assets.

EXEMPTION ON INVESTED CAPITAL

The act of October, 1917, stipulates that corporations or private individuals engaged in industrial business shall be allowed a certain return exempt from taxation on the "invested capital." It further provides a sliding scale of taxation on all earnings in excess of the exempted amount. Invested capital, however, includes only the capital represented by the physical property, unless the company is able to show that it has actually paid cash for its intangible assets. In this latter case, if it has paid cash for the intangible assets, these assets may be capitalized in an amount not to exceed the value of the tangible assets if the company is not incorporated. If the company is incorporated it can only capitalize the tangible assets at an amount not to exceed 20 per cent of the value of the tangible assets as found.

AN ILLUSTRATIVE CASE

To see just what this means in actual practice, let us assume a theoretical case. The John Doe Manufacturing Company—a private, or unincorporated firm—is manufacturing a useful commodity. The business has been built up, and the good-will established, after years of hard labor on the part of the members of the firm. Many of the articles manufactured are protected by patents. These patents have been the result of arduous labor on the part of members of the firm, and before they were perfected involved appreciable expenditures in their development. The ratio of these expenditures to the real value of the patents to the company, however, is small. All of the intangible assets, patent rights, copyrights, trade marks, good-will and business value, represent years of labor on the part of the firm and its employes. The invested capital upon which the firm is allowed to earn a certain return exempt from taxation, according to the terms of the act of October, 1917, includes:

1. Actual cash paid into the business.
2. Actual cash value of tangible property (other than cash) paid into the business.
3. Actual cash value of patents, copyrights, trade marks, good-will and other intangible property paid into the business at the time of such payment if payment was made therefor specifically as such in actual cash or tangible property.

In the case under consideration the company has made no cash payments for its intangible assets. The intangible assets have cost the company a good deal of money but they have not been purchased outright for cash. Under the terms of the act these intangible assets must be entirely ex-

cluded from the invested capital. The invested capital, therefore, really represents only the value of the physical property and the cash, or funds, on hand for operating the business. The company finds, after a careful appraisement that its tangible property is worth $500,000. This sum represents the reproduction cost of the property plus an allowance for working capital, etc.

Due to the immense expenditures the company has had to meet in building up this business it has only been able to earn a return of 8 per cent on a valuation of $500,000, for the past several years, and no return on the brains and labor involved in building up the intangible assets. During the present year, however, we find that the company has earned $200,000. Let us see what happens to this $200,000, when the tax adjusters get at it.

Private corporations are entitled to a flat exemption of $6,000. They are also entitled to a return on the invested capital—in this case $500,000—based on the earning rate prevalent for the pre-war period. In the case we are considering this rate of earning is 8 per cent and the additional exempted amount is 8 per cent of $500,000, or $40,000. The total exemption, therefore, amounts to $46,000, and the amount of net income subject to taxation is $200,000 less $46,000, or $154,000. The computation of the taxes on the $154,000 follows:

20 per cent tax on net income in excess of total deduction ($46,000) and not in excess of 15 per cent of invested capital for taxable year ($75,000) being $29,000	$5,800
25 per cent tax on net income in excess of 15 per cent and not in excess of 20 per cent of invested capital for taxable year, being $25,000	6,250
35 per cent tax on net income in excess of 20 per cent and not in excess of 25 per cent of invested capital for taxable year, being $25,000	8,750
45 per cent tax on net income in excess of 25 per cent and not in excess of 33 per cent of invested capital for taxable year, being $40,000	18,000
60 per cent tax on net income in excess of 33 per cent of invested capital for taxable year, being $35,000	21,000
Total tax for taxable year	$59,800

The total taxes of the company, therefore, amount to $59,800, or 29.9 per cent of the company's net income of $200,000.

FURTHER ILLUSTRATION

Now, let us assume, to illustrate the workings of the tax law, that the John Doe Company had sold its property and business—said business including all good-will, patent rights, trade marks, business values, etc.—to the John Smith Company for the sum of $800,000, and that the sale was effected prior to October, 1917. In the terms of the bill of sale it was stipulated that the John Smith Company should pay to the John Doe Company $500,000 in cash, for the physical property and $300,000, in cash for the intangible assets, such as good-will, etc. Inasmuch as the John Smith Company has paid cash for the intangible assets it is entitled to include them in the invested capital.

We may assume that the John Smith Company also earns $200,000 during the first year of its ownership of the property. According to the terms of the tax law it will be entitled to a flat exemption of $6,000, plus 8 per cent on the invested capital ($800,000 in this case), or a total of $70,000. The amount subject to taxation is $20,000 less $70,000, or $130,000. The computation of the taxes on this residue of $130,000 follows:

20 per cent tax on net income in excess of total deduction ($70,000) and not in excess of 15 per cent of invested capital for taxable year ($120,000), being $50,000	$10,000
25 per cent tax on net income in excess of 15 per cent and not in excess of 20 per cent of invested capital for taxable year, being $40,000	10,000
35 per cent tax on net income in excess of 20 per cent and not in excess of 25 per cent of invested capital for taxable year, being $40,000	14,000
Total tax	$34,000

The total taxes of the John Smith Company amount to $34,000, or 17 per cent on its net earnings, as against taxes of $59,800, or 29.9 per cent of the net earnings, for the John Doe Company. In other words, the mere fact that the John Smith Company has paid actual cash for its intangible assets entitles it to a reduction in taxes of $25,800 for the year. Obviously these intangible assets, when they were in the possession of the John Doe Company, were of appreciable value or the John Smith Company would not have purchased them for $300,000. However, the John Doe Company, which created the intangible value, could not, under the terms of the act include any allowance for intangible assets in its invested capital.

If either the John Doe Company or the John Smith Company had been incorporated still another story would have to be told. Briefly, the John Doe Company would be about in the same predicament as if it were a private company. The John Smith Company, however, having paid $300,000 for the intangible assets, would only be allowed to capitalize them at 20 per cent of the value of the tangible assets of $100,000.

INCREASED IMPORTANCE OF INTANGIBLE VALUES

All of this discussion is by way of preface to the following remarks on industrial intangible values. The act of October, 1917, has been subject to comment and it is not improbable that some of its problems will be reconsidered by Congress, among others, the question of making some provision for the capitalization of intangible assets, where such intangible assets have been brought into being as the result of years of hard labor in building up a business and represent a very real monetary value to the owners of the business.

It therefore behooves industrial managers to give this question of intangible values just as careful consideration as they would accord to the subject of purely physical values.

Fortunately the courts have established a precedent for the consideration of the value of the intangible assets in industrial appraisement. The writer has reviewed all of the American and many of the English cases involving intangibles, but has only been able to find one method of computing their value. This method is well illustrated in the following recent decision of an Iowa court:

Good will is an asset in a class by itself. Its intangible nature makes it an excuse for manipulation. The difficulty in dealing with this item is in the measurement of its value. It is uncertain but the courts protect it and declare it to be an asset. Business men and theorists insist that it be treated as property. Negotiable good will is the exception rather than the rule in business. Can the value of good will be anything more than each man's guess? Emerson said "Every successful business is the lengthened shadow of some one man." Good will depends upon varying contingencies and upon numberless factors whose vital value may change with the moon. But there are rules for measuring it which have met with favor. The factors which go to make good will are competition, patent rights, reputation for integrity, the personnel of the directorate, trade names, market conditions, pending orders, location, publicity, credit and annual earnings. These are the props

upon which good will is reared. All these factors contribute to the earnings of profits. The most satisfactory manner of determining the value of good will in dollars and cents is to take the average yearly earnings over a period of three or five years of uneven earnings as a basis. From this must be deducted interest at the rate of seven per cent on the average capital employed in such years. In this way we ascertain the actual surplus profits of the business. How many times then should these surplus profits be multiplied to get the value of good will? The answer can only be found in the peculiar facts of each case. I do not consider that in any case (except perhaps one of monopoly) the multiplier should be greater than two. In this case the average earnings covering a five year period (1906 to 1910, inclusive) are shown to have been $620,219.62. Deducting from this sum seven per cent on the average investment of $1,160,304.28 leaves a net surplus to be capitalized of $538,998.32.

By applying the accredited rules for computing the value of good will to these computations, a valuation much larger than I have placed on the intangible values of the common stock might easily be found. From a full consideration of the case in its various aspects, however, I am convinced that the valuation of $600,000 which I have placed on these intangible values is one which would have been just and equitable in defendant's dealings with the plaintiff.

This decision is most interesting—it not only clearly establishes a precedent for including the "intangibles" as a part of an industrial company's assets, but it also outlines a method for computing the value of the intangibles. It will be noted that the court describes the intangibles collectively by the term "good will." By good will the court undoubtedly means "total intangible value." The synonymous use of the terms good will and intangible value is prevalent in industrial legal cases. This is unfortunate, as it is apt to lead to confusion. Intangible value, as already suggested, includes other items besides good will, i. e., value of patent rights, value of trade-marks, going value and contract values.

Anyone who is at all skeptical as to the wisdom of including the intangibles as a part of the invested capital will find convincing proof that the intangibles have a very real value in the decision of this Iowa court. In the passage just quoted, the court says: "It (intangible value or good will) is uncertain, but the courts protect it and declare it to be an asset." In another portion of the same decision the court says: "Good will is, in fact, a fixed asset, * * * and the good will of the company is of substantial value."

METHOD OF COMPUTING INTANGIBLES

Possibly the court's method of computing the value of the intangibles may be made clearer by a simpler illustration. Take, for instance, the case analyzed in an earlier portion of this article, that of the John Doe Manufacturing Company. The physical property is valued at $500,000 a year and the company has a net income of $200,000 a year. Applying the method of the Iowa court, a fair return—say, 8 per cent—on the value of the physical property should first be deducted from the $200,000 net income. Eight per cent of $500,000 is $40,000, and the "surplus profits" amount to $200,000 less $40,000, or $160,000. The value of the intangible "something" that produces these excess profits of $160,000 is uncertain, depending upon the stability of this portion of the net income. In the case of the John Doe Manufacturing Company it was assumed that the company had struggled along for many years, earning a return of only 8 per cent on the physical property, and that it had just reached the point where it was beginning to realize a return on the immense amount of labor involved in building up the business. Following the precedent of the Iowa court, we would not, in this case, be justified in assigning to the intangibles as high a value as if the company had been maintaining an income of about $200,000 a year for a number of years preceding the appraisal.

In all probability if the court in question had been confronted with the task of assigning a value to the intangibles of the John Doe Manufacturing Company, it would have appraised them at $160,000, the amount of the surplus profits for the current year. If, however, the company had maintained an average in earnings of $200,000 for, say, five years preceding the appraisal, there is ample precedent in other court cases for the capitalization of the intangibles at as high as 20 per cent. If the $160,000 surplus profits accruing from the intangibles were appraised at 20 per cent, the value of the intangibles would be $800,000—in other words, they would be worth much more than the purely physical property.

The method outlined in the foregoing decision has one marked defect, it does not provide for the segregation of the various elements of intangible value. The items component to the total intangible value of an industrial organization are so diversified that it is most desirable to find some means of computing their respective values. The method suggested in the following paragraphs has ample precedent in the public utility field and there is no reason why it should not be equally well adapted for use in the industrial field.

VALUE OF PURCHASING CONTRACTS

Taking up the various elements of intangible value in the order in which they are enumerated in Table I, we have first, the value of the purchasing contracts. Many industrial organizations are fortunate enough to possess long term contracts for the purchase of their fuel and raw materials. A company may have a contract with a coal-mining company which calls for the delivery of a certain specified amount per annum at a fixed price or at a price based upon a flat amount per ton and subject to certain increases, or decreases, in the event of a rise or fall in the labor market. Obviously such a contract is a very real asset to the industrial company possessing it, and the value of this contract is a part of the total intangible value.

To show the correlation between the various elements of physical property and the elements of intangible value an hypothetical case has been assumed as illustrated in Table I.

TABLE I. RELATION OF INTANGIBLE TO PHYSICAL PROPERTY

Item		*Reproduction Cost*
Direct construction costs:		
Inventoriable property	$407,000	
Omissions and contingencies	16,500	
Purchasing expense	8,250	
Tools and tool expense	8,250	
Total direct construction costs		$440,000
Collateral construction costs:		
General and legal expense	$ 21,000	
Engineering and general supervision	20,000	
Taxes and insurance (during construction)	5,000	
Interest (during construction)	14,000	
Total collateral construction cost		$ 60,000
Total physical property		$500,000
Non-physical (or intangible) assets		
Value of purchasing contracts		
Value of patent rights		
Cost of establishing business (or going value)		
Cost of financing		
Value of good-will and trade-marks		
Total non-physical assets		
Total value (on a reproduction basis) of plant and business.		

The following method of determining contract values has a precedent in public utility practice. We may assume that an industrial company has a contract providing for the delivery of coal at $2 a ton, for a period of five years and that three years of the life of the contract have elapsed at the date of appraisal. During these three years the company has had an average consumption of 5,000 tons per year, and it seems reasonable to assume that a similar amount will be required during the unexpired term of the contract. The total estimated consumption for the five-year period is then 25,000 tons and the cost of the coal at $2 per ton is $50,000. We may also assume that the average market price for the grade of coal used by the company for the three years has been $3 per ton and, further, that the company is warranted in assuming that the market price for the unexpired term of the contract will be at least $3 per ton. Therefore, if the company had been obliged to purchase its coal in the open market it would have had to pay $75,000 instead of $50,000, and under the terms of its contract the company has saved $5,000 a year. The value of the contract to the company may be determined by capitalizing the $5,000 annual saving at 8 per cent on the assumption that 8 per cent represents a fair rate of earning for the business; $5,000 capitalized at 8 per cent is $62,500. The fact that the contract has only a five-year life should be cared for by depreciating the $62,500 value at the rate of 20 per cent per annum.

The foregoing method was advocated by the Public Service Commission of St. Louis in the appraisal of the property of the Union Electric Light & Power Company.

VALUE OF PATENT RIGHTS

Undoubtedly the appraisement of the patent rights of an industrial company is one of the most exacting problems involved in the determination of the intangible values. The following method seems reasonable and can undoubtedly be substantiated before the courts. It is first necessary to analyze a company's net income and determine what proportion of the income results directly from the sale of patented articles. Obviously, after the patents have expired this portion of the income will be materially reduced, due to the fact that the company's competition will have the privilege of manufacturing the same, or very similar articles. During the life of the patents, therefore, the patent rights have a real monetary value and this value may be measured by the income resulting directly from the sale of the patented articles.

We may assume that the company under investigation has an income of $200,000 a year, and that an analysis of this income shows that $100,000 may be attributed directly to the sale of patented articles. This $100,000 income accruing from the patent rights, will be materially reduced when the patents become public property. It is probable, however, that the company will still be able to derive some revenue from the sale of the articles in question after the patents have expired—in competition with other companies. We may assume that an estimate of a revenue of $40,000 a year from the sale of the patented articles—after the expiration of the patents—has been agreed upon as conservative by the officials of the company. The income that may be attributed directly to the patent rights is, therefore, $100,000 less $40,000 or $60,000. The valuation of these patent rights may therefore be effected by capitalizing the $60,000 income at 8 per cent and the value of the patent rights would, in the case under consideration, be $60,000 divided by 8 per cent, or $750,000.

Obviously a rate of return as low as 8 per cent would only be justified if the income resulting from the sale of the patented articles had been maintained at about the same rate over a long period of time. In the case of the John Doe Manufacturing Company previously referred to, where the net income has experienced a marked rise within a comparatively short time, the patent rights would have to be capitalized at a much higher percentage and the value of the patents would be very much smaller.

COST OF ESTABLISHING BUSINESS

Cost of establishing business, or going value, is frequently confused with good will. These two items of intangible value are, however, entirely separate. The cost of establishing the business may be defined as "the cost of acquiring the net income prevailing at the appraisal date," or as "the amount resulting from the capitalization of the losses incurred in building up the business."

There are three distinct elements involved in the computation of the cost of establishing the business. These elements are

(a) Cost of organization and development during business building period.

(b) Cost of securing customers.

(c) Net interest on the operating losses during the business development period.

ORGANIZATION AND DEVELOPMENT

In establishing a new business it is self-evident that an organization—including the executives and employes of all of the departments—cannot be gathered together without an appreciable expenditure of money. The expense involved in building up an organization usually bears a fixed ratio to the reproduction cost of the physical property. In public utility practice there is ample precedent for an allowance of 2½ per cent of the cost of the physical property to cover the cost of building up an operating organization. In industrial practice the determination of this percentage is largely dependent upon the exigencies of the case under consideration. It is possible, however, to determine a percentage for any given industrial appraisement that will be susceptible to substantiation.

COST OF SECURING CUSTOMERS

No industrial business can be built up without the expenditure of a large amount of money for the securing of customers. This cost resides in the salaries and expenses of salesmen, in advertising and in the accompanying clerical expenses. It is possible, by making a careful analysis of the company's expenses over a period of years, to determine a cost per customer, and this actual cost per customer, as determined from the company's books, when multiplied by the total number of customers on the books at the date of the appraisal, will give a conservative estimate of the expenditures involved in this portion of the business building process.

NET INTEREST AND OPERATING LOSSES DURING DEVELOPMENT

In public utility practice it is customary to compute the interest and operating losses during the business developing period of determining, as accurately as possible, the length of time that would be required to reproduce the business as it stands at the date of appraisal, and by subsequently computing the interest

and operating losses as incurred during this period. In the space assigned to this article it is impossible to give a detailed discussion of this phase of the problem. Suffice it to say that the same method is applicable to industrial appraisals and that the interest and operating losses during the business developing period may be computed with a reasonable degree of accuracy .

COST OF FINANCING

Needless to say there is always an expense involved in the marketing of industrial securities. To illustrate, the securities of a certain industrial concern may have a par value of $100. In financing the business it will probably be found necessary to sell the securities far below the par value. If we assume that the securities in question are sold to the public for $90 and that the fiscal agents involved in the transaction charge a commission for their services of 2½ per cent, the total cost of financing for each $100 will be $100 less $87.50, or 12.50. In other words, for each $87.50 the company receives it will have to pay back $10, and it therefore incurs a net loss of $12.50.

This cost of financing is a very real element in the total cost of creating a business and if the business is being appraised under the reproduction cost method some allowance for financial costs should be made.

VALUE OF GOOD-WILL AND TRADE-MARKS

The value of good-will and the value of trademarks are so closely allied that it is almost impossible to effect a segregation in computing their monetary equivalent. The only method of estimating the value of good-will that has yet been advanced is the one advocated by the Iowa court in the decision already referred to. This method, however, will have to be slightly modified to meet our present requirements. Referring again to our illustration of a company whose physical property is valued at $500,000 and whose net income for the year preceding the appraisal amounts to $200,000, the value of the good-will may be computed as follows. We may assume that the value of the various items of intangible value have been computed by the methods outlined in the foregoing paragraphs with the following results:

Value of purchasing contracts	$ 62,500
Value of patent rights	60,000
Cost of establishing business	50,000
Cost of financing	62,500
Total	$235,000

The value on a reproduction basis of the physical property and of the intangible as thus far computed is $500,000 plus $235,000 or $735,000. The return of 8 per cent on $735,000 amounts to $58,800. The amount of net income which may be attributed to the good-will of the business is, therefore, $200,000 less $58,800 or $141,200. Inasmuch as the company has maintained its present income—$200,000—for only one year, we probably will not be warranted in capitalizing the earnings resulting from the good-will at less than 100 per cent., and the value of the good-will in this case would, therefore, be $141,200. This added to the value of the intangibles as already computed gives a total intangible value of $376,200, and a total value for the plant and business of $876,200.

Undoubtedly, the new War Revenue Tax Act will play a most important part in industrial financing. It will present many interesting and unusual problems to the industrial manager. Whether or not Congress will modify the terms of the act to provide for the capitalization of hard earned and properly constituted intangible values we do not know, but there is reason to believe that the ultimate outcome will be satisfactory to all of the interests involved.

If industrial companies are allowed to capitalize their self-created intangible assets, there is ample precedent for determining their monetary equivalent by the method of the Iowa court, as described in this article.

The Five-Minute Limit

Telephone conversations are to be limited to five minutes by an order given out by F. W. Atkins, district manager of the Central Union Telephone Company for La Salle and Peru, Ill. Likewise, in the future operators will disregard queries from patrons as to locations of fires.

These changes are for the benefit of the service and designed to eliminate a growing condition which has tended to decrease the telephone company's efficiency.

The statement says:

"At a meeting of the management and the operators, it was decided, for the benefit of the public, for the benefit of those who use and do not abuse their telephones, to enforce the rule of a five-minute conversation. At the termination of the five minutes, the subscriber will be notified that the time is up, and if they do not cease their conversation, the connection will be taken down. The reason for enforcing this rule is the complaints are continuously advised that the line is busy.

"In the telephone business, like in every other business, there are subscribers who think that they are the only persons who pay for the use of the service, and fail to consider their neighbor or the party on the other side of the line. To illustrate how this matter works: A farmer on one of our county lines would call to some one on a two-party line in La Salle. It has been known for some to hold the line for thirty minutes, and when the operator is asked why she allowed this continuous service she replied: 'Nobody has asked for the line.' She forgets that the other nine subscribers on this farmer line are unable to make their wants known, being unable to ring in, while one subscriber is 'hogging' the line.

"The five-minute rule will go into effect at once, and the management appeals to every person to assist them in carrying it out so that all may get better service."

Freeport Exchange Dissolves

A certificate setting forth the dissolution of the Freeport Telephone Exchange Company has been filed in the Illinois recorder's office. By an act of the stockholders of the company it was voted by a majority to surrender the charter, franchise, name and corporation and dissolve the said company.

The company formerly was operative in Freeport and while it was indirectly a part of the Bell system, it had the distinction of being one of the few companies which existed in that manner—that is, the stock was owned by private individuals and not by the Bell system. The company several years ago sold out to the Stephenson County Telephone Company, which took over all possessions of the former company.

Chicagoan Invents Rapid Telegraph

Thomas B. Lambert, inspector for the Chicago Telephone Company, has invented a telegraph contrivance that can both send and receive 6,000 words a minute—100 words a second. He has demonstrated it. The government has sent Capt. Charles A. Culver of the radio corps to interview Mr. Lambert and make an investigation.

Aging of Rubber Insulating Compounds

As pointed out in the *Electrical World*, the Underwriters' Laboratories has been conducting a series of tests bearing on the life of the rubber insulating compounds employed on wires and cables. A complete record of the results of the tests is beyond the scope of this article, but a tabulation of the test results obtained during the six months' period ended July 1, 1917, has been completed and a partial summary of the tests is given in the accompanying table. This table includes the data of about 250 tests, and is quite representative of the character of the results obtained throughout the investigation. Data on tests for permanent sets are not given, as the work has shown that this property is not materially affected by three years' aging.

The "percentage loss" figures are possibly not absolutely correct. Owing to changes and improvements in test methods and apparatus made in three years, the results may not be exactly comparable, but it is considered that they are quite representative of the performance of samples after three years' aging. In connection with the work, samples showing excessive deterioration have been traced in regard to their original performance in the chemical tests, in case such tests have been made. In a large percentage of these cases the sum of the percentages of acetone, chloroform and alcoholic potash extracts, total sulphur and ash have been found to exceed the specified total of 80 per cent. It may also be mentioned that the converse has in general been found to hold good, as most samples showing super-standard qualities in the chemical tests performed favorably in this work. Many of the samples are to be tested after another year of aging.

AGING OF RUBBER INSULATION.

Average Tensile Strength, Lbs. Per Sq. In.		Per Cent Loss in Tensile Strength in Three Years	Average Elongation, Inches		Per Cent Loss in Elongation in Three Years
New	Old		New	Old	
673	647	3.8	7.7	6.8	12.1
673	580	13.8	7.1	5.7	20.0
655	647	1.2	6.5	4.7	28.0
650	532	18.1	6.9	6.0	13.7
649	624	3.9	6.8	5.6	18.1
602	505	16.2	6.9	5.9	14.9
552	503	8.7	6.6	5.5	16.8
533	517	3.0	7.2	5.8	19.6
531	538	*1.3	7.2	5.9	18.3
521	501	3.7	6.2	5.6	10.2
498	486	2.6	6.6	5.1	22.3
497	415	16.5	6.8	5.4	21.2

*Indicates gain in tensile strength.

An average of about 450 tests conducted during the last six months shows losses of 10 per cent for tensile strength and 18.2 per cent for elongation.

Aero-Radio Telephone

An aviator at the Wright field in Dayton, O., demonstrating a perfected wireless telephone, conclusively proved the success of the invention by asking the persons at the airplane works what the various buildings in Dayton were, and receiving replies such as a resident would give a stranger walking the downtown streets.

This information was divulged by Charles F. Kettering at a meeting of National Cash Register employes in the N. C. R. City Club. Mr. Kettering had addressed the gathering on the types of flying machines in war use in Europe and had outlined the United States government's air plans in a most interesting and illuminating manner. In speaking of the methods used by fliers to signal battery commanders he touched on the local episode as indicating the most recent advance in radio communication.

According to Mr. Kettering, an airplane equipped with the wireless telephonic outfit hovered high over the city and kept up a constant communication with the earth.

"Below me is a water tower and near it a pond. What is is?" asked the aviator, for he was a stranger.

"That is the National Military Home," was the reply. Later he asked about a group of buildings set among greensward and the reply was "the N. C. R. plant."

The invention and perfection of the wireless telephone lies to the credit of Mr. Kettering, coming as a climax to an already long list of inventions of utility and practicability. Mr. Kettering has been conducting experiments on this medium of radio communication for a long time at a wireless plant situated near his home. This radio station had been erected for just such experimental purposes, was licensed by the government and is the only one in the country thus situated that is not under naval control.

What the telephone will do for aero work both in peace and war is difficult to estimate according to the inventor. Its phases and possibilities are so many and varied that the system of aero communication and travel will be revolutionized. Its present success, it is considered by those in authority to know, is as great an achievement as the first successful fight of an airplane.

The Telephone in Denmark

Engineering, of London, announces that as the concessions of the 10 important telephone undertakings in Denmark expire between 1918 and 1920, the Danish government has appointed a commission to investigate and report upon the whole question of how the telephone problem has to be solved for the future, whether the telephone system in its entirety is to be State owned or not.

The 10 undertakings comprise the Copenhagen Telephone Company (which works the whole of Seeland), the municipal telephones of the island of Fuhnen, two companies in Jutland, and some in the smaller islands, including the Faroe Islands' municipal telephones. There are about 130,000 subscribers, and the number of telephone conversations last financial year was about 300,000,000. The Copenhagen Telephone Company, which is the largest, has an aggregate length of 300,000 km. of line and 74,000 subscribers.

The Coal-Bin Extensoin

A secret telephone connection installed in the coal bin at their home is mentioned by Mrs. Marian Bishop in a suit for divorce filed against her husband, J. W. Bishop, at Kansas City, Mo.

The secret connection was for the purpose of "listening in" on her conversations over the telephone, Mrs. Bishop asserts.

She declares her husband accused her of accepting attentions from other men and employed detectives to watch her. She discovered the telephone in the coal bin after Bishop was arrested as a suspected burglar by a policeman who saw him crawling out of the cellar window at a time his wife didn't know he was at home.

In order to secure his release from the police Bishop was forced to go to the front door and have his wife identify him, she says. and thus she learned of the incident.

Loading Coils versus Repeaters

Properly Designed and Correctly Installed, Loading Coils Are Adequate for All Long Distance Work

BY W. N. FURTHMANN

IN the February issue of TELEPHONE ENGINEER it was pointed out that the receiving element was a polarized device. It was also argued that unless a balance was obtained and also maintained upon both sides of the bridge circuit and between both sides of such a bridge the repeater would sing or howl. In his earlier patents Mr. Shreeve claimed many advantages for this bridge connection of the relay circuit. In order to illustrate the force of argument in connection with use of a repeater having a receiving polarized device and to show that there are many reasons why a series connection of the relay has been found preferable to the bridge connection, a summary of Shreeve patent No. 863,230 dated August 13, 1907, applied for on May 4, 1906, may be found worthy of study.

The repeating induction-coil of the system is so associated with the transmitting-circuit and bridge-connection that the receiving element responds freely to telephone-currents impressed upon it by said transmitting-circuit, and when the latter is properly balanced as to its electrical properties upon the opposite sides of the bridge connection the receiving element is neutral with respect to the reinforcing currents which the transmitting element throws upon the line. In systems of this character, however, a difficulty is encountered which prevents the attaining of equal efficiency in the renewal of the current transmitted in opposite directions over the line. This arises from the fact that the receiving element is a polarized device, and to insure equally effective operation under the influence of currents generated upon both sides of its bridge some definite relation must be established between the polarity of the receiver and the direction of the operating current otherwise the condition created might sometimes oppose rather than reinforce such operating-current. Moreover, telephone-lines of less than a certain length are liable to present a fluctuating impedance. This arises from the fact that the varying impedance of terminal stations is apparent throughout the transmitting-circuit until it is offset by the capacity of a sufficient amount of line, when the circuit-impedance may become substantially a constant as far as such apparatus as is now under consideration is concerned. This limits the application of the previously-mentioned reinforcing system, since with shorter lines it becomes difficult to maintain the electrical balance upon opposite sides of the bridge-connection necessary to secure the neutral condition without which the receiving element of the relay is liable to "sing."

In Fig. 1, L and L^2 designate the opposite sides of what is here shown as a metallic telephone-circuit or main line connecting stations A and B, these stations being provided with the usual or any convenient form of telephone apparatus. At some intermediate point is a station C at which is located a repeating or current-reinforcing apparatus. This need not be midway between the terminal or transmitting and receiving stations, but at such relative distance from them as the conditions peculiar to each installation demand.

Included in the line at the station C is one winding m of a transmitting induction-coil M which, for the sake of simplicity and clearness, is shown in the limb L, though, as will appear later, it may be in sections contained in both limbs. This induction-coil may be considered as a portion of the reinforcing apparatus which, in the present instance, comprises a circuit L^3 having no conductive relation with the transmitting-circuit but which is associated therewith inductively by the associate winding m^2 of the coil M. Between conductors *10* and *11* of the reinforcing circuit, which join the winding m^2 with a winding n of an induction-coil N, to be later described, is a bridge-connection *12*. In this bridge is the receiving element r of a relay or repeater R which may be of any suitable type for example, that disclosed in my Patent No. 791,655, dated June 6, 1905. The transmitting element r^2 of the relay is contained in a local circuit L^4, which is also to be considered as an element of the reinforcing-circuit, together with some such source of electrical energy as a battery b and the primary winding p of an induction-coil P. The secondary winding of this coil is included in the conductor *10* of the circuit L^3, and is symmetrically divided into sections p^2 p^3 which are connected to one another at one extremity of the bridge *12*.

Associated with the reinforcing-circuit, in the present instance inductively, is a balancing-circuit L^5 in which is the winding n^2 of the coil N. This circuit L^5 constitutes an artificial line presenting substantially the same electrical properties as the main line. To readily secure and maintain such similarity the circuit L^5 includes a suitable adjustable resistance S in series with the winding n^2 and an adjustable condenser or capacity-varying means V in parallel or shunt relation to such resistance.

In the operation of the system, telephone-currents generated at either of the stations A or B flow through the main line and the winding m of the coil M. A portion of the current induced in the winding m^2 contained in the reinforcing-circuit passes through the bridge *12* and receiving element r of the relay and operates the transmitting element r^2, resulting in a variation in the resistance of the latter and consequently in the current put upon the local circuit L^4 by the battery b. This current in the winding p induces like current in the same direction in the sections p^2 and therefore in the circuit L^3, which adds itself to that already present and acts inductively through the coil M to augment the talking-current in the main line. It is evident that to prevent the reinforcing-current from reacting upon the receiving element and causing the apparatus to "sing," said receiving element must be rendered neutral to the energy generated in the relay. This necessitates the maintaining of an equal potential at the opposite extremities of the bridge *12* and an equality in the current through the sections p^2 of the secondary of coil P. To attain these conditions the opposite sides of the reinforcing-circuit with respect to the bridge are balanced electrically, the energy converted through the coil N between the reinforcing-circuit L^3 and the balancing-circuit L^5 being equal to that exchanged between said reinforcing-circuit and the main line through the coil M. This follows because the induction-coils M and N are similar and act between symmetrical halves of one circuit and two circuits which are equivalent to one another, this latter condition being attained by varying the resistance and capacity of the circuit L^5 until it corresponds to that of the line. In this manner the desired neutrality of the receiving element to the reinforcing-current is secured and reactive disturbances are eliminated. On account of the serial connection of the reinforcing apparatus with the line and its transmitting-stations a constant current relation may be preserved, and the difficulty as to the polarity of the receiving element is obviated. At the same time the necessity for maintaining an adjustment between the varying electrical conditions of portions of the line is done away with, since here only a balance for the entire line is required. This enables the apparatus to be located much nearer one of the transmitting-stations than has been possible before.

In Fig. 2 of the drawings an arrangement of the system has been illustrated in which a conductive relation exists between the transmitting and reinforcing-circuits, and also between the latter and its balancing-circuit. Here, a winding of the repeating induction-coil P has one section p^2 of its divided secondary winding connected in series with the receiving element r of the relay R in the limb L of the line at the station C, said station being situated as before between the stations A and B. The other section p^4 of the secondary is connected in a circuit L^4 constituting both the reinforcing and balancing-circuits, and of which a portion of the main line containing the receiving element between the points x and y forms a part. Of this circuit a conductor *13* extends from the point x between the winding p^2 and the receiving element r, back to the line upon the opposite side of the receiving element at y. As just stated, it includes the section p^4 of the secondary of coil P, and also contains the adjustable condenser V. In parallel with the condenser in a conductor *14* is the adjustable resistance S. The transmitting element is, as in the form previously described, connected in a local circuit L^4 with the battery b and the primary p^5 of the repeating induction-coil. In this embodiment of the invention, a portion of the current transmitted from either of the stations A or B flows through the receiving element of the relay. This operates the transmitting element as in the arrangement of Fig. 1, and causes the primary winding p^5 of the coil P to induce current in the sections p^3 and p^4. By oppositely winding or oppositely connecting these sections, the latter being here shown, these currents are added

to one another to increase the talking-current flowing through the line and the circuit L^6. At the points x and y these reinforcing-currents in the sections p^3 and p^4 will oppose one another and, when the resistance and capacity of the artificial line furnished by the circuit L^6 have been adjusted by means of the devices S and V to equal those of the main line, they will be balanced and will not react upon the receiving element.

Fig. 3 shows still a third embodiment of the invention in con-

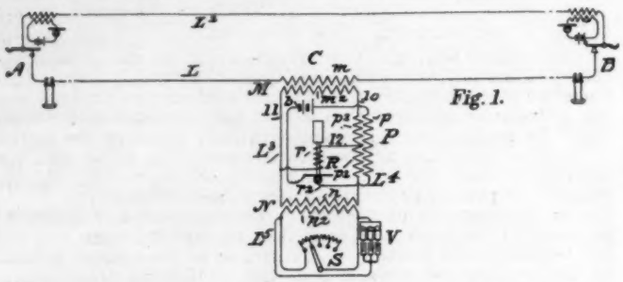


Fig. 1.

nection with a composite telephone and telegraph line. The telephone-stations A and B are connected by the line conductors L and L^3 as before, but in addition each limb of the line provides with conductors *15* grounded telegraph circuits connecting stations A^3 B^3 and A^2 B^2, each having appropriate sending and receiving-instruments. At the intermediate station C is the reinforcing circuit L^5 associated with the line and with the balancing-circuit L^6, by induction-coils M^2 and N as described in connection with Fig. 1, except that the coil M^2 is shown as being provided with a section m^3 included in each side of the line and each as having an associate winding m^4 in the reinforcing-circuit. The latter windings are oppositely connected to secure the proper direction of induced current and serve to balance the limbs of the main line to prevent the introduction of inductive disturbances from lack of symmetry. To avoid interference with telephonic transmission by the currents employed in telegraphing, each of the coil sections m^3 has in series with it a condenser V^2, each of these pairs of elements being shunted by a suitable impedance-coil W. At each telephone-station A and B similar condensers V^3 are inserted between the telephone-instruments and the connection of the telegraph-branches *15*, and these branch conductors include impedance-coils W^2. The condensers and impedance-coils operate in a manner well known, the former giving relatively free passage to the high-frequency telephone-currents and excluding the slower telegraph-currents, while the latter present a much greater efficiency to currents of low periodicity. Thus, paths are furnished for the telegraph-currents without impairing telephonic transmission. To maintain the correct balance of the system a coil W^3 is placed in the balancing-circuit L^6, it offering the same amount of impedance as the coils W W in series, while a condenser V^4 having one-half the capacity of each of the condensers V^2 furnishes the equivalent of said condensers V^2 V^2 in series. In connection with this composite system a further modification of the reinforcing-circuit has been illustrated, though it is to be understood that it is equally applicable to a simple telephone-circuit, and that the forms hereinbefore described may be used with a composite circuit. In this case the divided winding is that of the receiving element, the sections being designated by the characters r^3 r^3. These sections are symmetrical and are connected in the conductor *10* upon the opposite sides of the bridge *12*. This bridge now includes the secondary

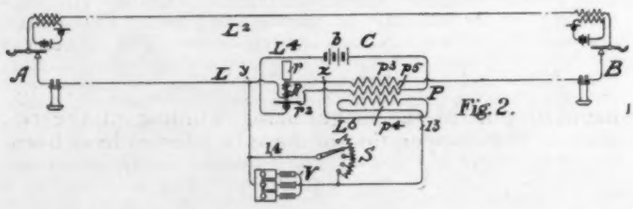


Fig. 2.

winding p^6 of the induction-coil P^3, the primary p^7 being in the local circuit L^4, as in the arrangements of Figs. 1 and 2. The currents induced from the main line in the reinforcing-circuit act upon both sections of the reinforcing element similarly to actuate the transmitting element. The reinforcing-current introduced in the winding p^6, by means of the variations of current caused by the transmitting element in the winding p^7, passes in opposite directions through the windings of the repeating-element r^3, producing the desired neutral condition as regards the energy generated in the relay. It will be seen that the relay-current in the reinforcing-circuit upon the side of the bridge-connection toward the transmitting induction-coil is such as to reinforce the line current, while upon the side toward the balancing-circuit it opposes that induced in the line, but this latter condition does not lessen the efficiency of the system, since its effect is exerted only upon the artificial line.

Fig. 3 is of particular interest as showing the use of a repeater in connection with circuits arranged for a composite telephone and telegraph system and the necessity of compensating for such a system at the repeater station.

Upon reference to Fig. 1 in the January issue of TELEPHONE ENGINEER it will be seen that in the Shreeve patent of 1905 it was proposed to overcome heating effects in the repeater by means of a radiator device. An examination of this patent will show that no effort was made at that time to employ any means such as an electrostatic device to overcome the tendency of the carbon granules to pack. It will be proven as these articles progress that this condition of packing the granules in the transmitter button of a repeater is one of its most detrimental characteristics.

While it is true that the packing of carbon granules has been known to exist in an ordinary transmitter without a great decrease in its life and efficiency it cannot be assumed that a transmitter problem of this

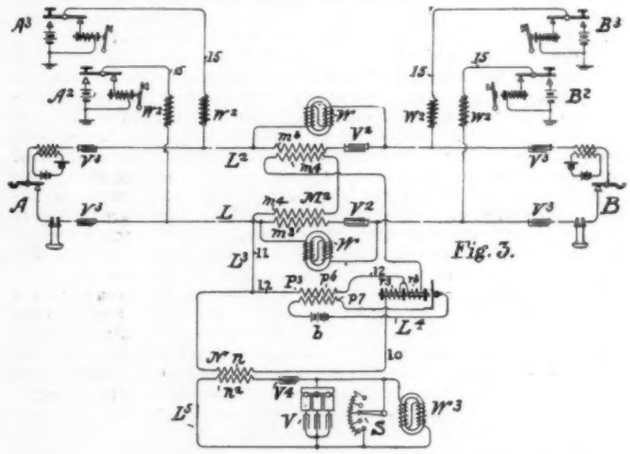


Fig. 3.

kind can be compared to a similar condition found in a repeater. Experiments with a repeater both in the laboratory and under actual operating conditions have demonstrated conclusively that the packing of carbon granules in a repeater occurs to such a great extent as to be prohibitive in a similar amount in an ordinary transmitter.

This feature of a repeater button is so important as to emphasize the fact that the experiments described and the results obtained were not carried on by the writer or any of his associates but by the inventor, Mr. Shreeve. Evidence by means of patents will be produced to prove this assertion and will further show that the condition noted was found to be so serious as to require his continued effort over a range of many years in the attempt to overcome a defect that would make a device of this kind injurious rather than helpful to good transcontinental transmission.

It will be shown that in Mr. Shreeve's patent No. 836,611, dated November 20, 1906, and applied for in October, 1906, a thermostatic device was first considered for this purpose. At this point it may be of advantage to remind the student that the radiator

described in the patent of 1905 was to serve the purpose in a very satisfactory manner. In ordinary transmitter construction it has always been considered satisfactory so to design the carbon cups of the transmitter as to provide sufficient contraction and expansion not only to provide good transmission but also to overcome the tendency of overheating.

In repeater design it has been found that this heating effect is so harmful that it is absolutely necessary to incorporate a thermostatic chamber. It was also found necessary to provide means in the circuit for regulating such a device so as automatically to rearrange and loosen the mass of carbon granules as to restore its normal resistance and efficiency should it become abnormally compacted. Anyone who has tested ordinary transmitters immediately becomes acquainted with the fact that the tendency of the carbon granules to pack materially impairs the resistance-varying properties of the mass in responding to relative vibrations of the electrodes. Such packing of the carbon granules may be due to variations in the quality or chemical content of the carbon, to the natural tendency of the carbon granules to settle toward the bottom of the carbon chamber, when used in the normal operation of the instrument; to the constant and relative vibrations found everywhere; to the vibrations in buildings where such instruments naturally are used; to the expansion effects of heat generated in the carbon, and by the normal passage of current at which the transmitter is operated.

All of these conditions as noted in the design of an ordinary transmitter and considered unavoidable and permissable are prohibitive in a repeater.

It has also been found permissable in the manufacture of transmitters to consider the commercial variation of resistance of a common battery transmitter between 40 and 60 ohms. It has been found that the tilting of a hand set from side to side will materially increase this maximum amount of resistance. It will be shown that these permissable variations in a transmitter can not be considered as at all possible in the design and use of a repeater. An analysis of this kind is of value because it is continuously claimed that a repeater of transmitter design is efficient solely because an ordinary transmitter has been found satisfactory along these lines. It will be clear then that the objects of a reliable thermostatic device are varied and many. The methods devised by Mr. Shreeve have been as many and varied and because of his numerous demonstrations of excellent mechanical ability it is not proposed to censure by recording that they have not overcome this material defect of a repeater.

A suitable thermostatic device must be so connected to a movable wall of the carbon chamber that when heated to an abnormal temperature it will draw out the movable wall to increase the interior dimensions of the chamber and thus lessen the pressure upon the granules. Some idea of the intricate problem involved may be gained from the fact that the thermostatic device must be so constructed that with the carbon granules in their normal condition, the current which the carbon permits to pass to the thermostatic device will not produce in the latter sufficient heat to cause it to move the wall of the chamber. The heat thus produced must be dissipated by conduction and radiation. Provided such a sensitive adjustment and equilibrium is obtained, it is very clear that any change that takes place in the circuit (and many changes do take place) disturbs the desired balance.

It will be clear therefore that when the carbon granules become packed and the resistance to the current passing through from one terminal to the other is considerably reduced, increased current thus permitted to circulate generates an abnormal heat in the thermostatic device, which then draws out the movable wall, loosening the mass of carbon granules and their contact with the electrodes. Thus a material and sudden increase of the resistance of the button occurs and a corresponding drop in current flowing through the thermostatic device and the heat generated therein.

It will be evident that when the temperature drops the thermostatic device must contract, forcing the movable wall inward, thereby decreasing the capacity of the chamber, completing the desired rearrangement of the microphonic particles which are to be again distributed in a loosened condition within the chamber.

This is believed to be the correct theory of the manner in which the contraction and expansion of the chamber effects the redistribution of the packed carbon mass. It is of course impossible actually to observe the changes which take place. Even though it were possible to do so the movements would be almost imperceptible and the changes are to be considered as swift and recurrent.

It will be noted that in addition to the small, sensitive, delicate parts of a transmitter button as used in a repeater it has now been found necessary to add a very small and equally sensitive thermostat. Thermostats as a rule are very simple in construction and their success depends upon this principle in their construction.

Most thermostats are used under conditions that by themselves do not limit the field under which a thermostat may be mechanically constructed. It will not be surprising therefore to find that the mechanical requirements of a transmitter or repeater thermostat require the use of gold as one of its elements. It will also be shown by copies of additional patents that it was finally found necessary to devise an electromagnet to be used in connection with a thermostat of this construction before the problem was to be considered as overcome.

By means of an electrostatic diaphragm and a suitable electromagnetic system of opposing coils it has been found in practice that such a diaphragm has a periodic movement, the period being about thirty to forty seconds duration. Such a movement although very short is sufficient to keep the granules in a free and highly sensitive condition.

This periodic movement of the diaphragm can be determined by placing a Milammeter in the local transmitter circuit. With a current of about 400 Milamperes in the circuit the needle will show a periodic movement of about twenty milamperes. The thermostatic diaphragm being partly of iron is acted upon not only by heat generated in the granules but also by magnetic pull of the magnetizing winding of the receiver. The co-operation of these two forces have been found necessary to relieve the pressure on the granules whenever the carbon has a tendency to pack.

(To be continued.)

The Bell Telephone Company of Pennsylvania, owning about 90 per cent of the stock of the Central District Telephone Company of Pennsylvania, will acquire the balance at $108.78 a share. A special meeting of stockholders is called for April 26.

Big House for Dallas Merger

A new building for the housing and accommodation of the merged telephone interests of Dallas, Texas, is being discussed. Tentative architectural plans, it is reported, already have been drawn.

The proposed new telephone home is to be not less than eighteen stories high, strictly fire-proof, ornate in its architectural lines and modern to the last degree. It is to be constructed, it is said, so as to afford a modern home for a great telephone corporation, facilitate its operation and contribute every means toward making the service highly efficient.

Information obtainable at this time is to the effect that the proposed building will cover almost if not an entire city block. The minimum cost is fixed at a million and a quarter dollars.

The telephone merger ordinance soon to be finally passed by the board of city commissioners, must be approved by the people at the April election before it can become effective. The grantees then will have ninety days in which to accept it, and one year in which to consolidate the two telephone exchanges. J. C. Casler of the Automatic company, and E. D. Nims of the Southwestern, in whose names the franchise is being taken, says there is to be no delay in carrying forward the merger plan.

The consolidated telephone system will be divorced from the Southwestern Telegraph & Telephone Company and operated as an entirely separate enterprise. It will be strictly a Texas corporation with Dallas men as its officers. The Southwestern will continue to operate its toll lines from this point and will maintain its general offices here.

Upon the adoption of the merger franchise ordinance by the people and its acceptance by the representatives of the two companies, steps will be immediately taken for the organization of a local corporation to take over the two interests and perfect the merger.

In order to show its complete divorcement from the Southwestern the new corporation will be named the Dallas Telephone Company.

Would Enjoin Power Wires

The Missouri Pacific railroad has petitioned the federal district court for western Arkansas to enjoin further construction or attempt at operation of the electric power wires which are being strung along the north side of the Arkansas river for conveying electric current to a number of towns between Van Buren and Clarksville.

The petition was filed in the federal court in Fort Smith yesterday and it names the Cities Service Company as defendant. The charge upon which the petition is based is that defendants have failed to comply with agreement to maintain their wires at an agreed distance of not less than 90 feet from the telephone and telegraph wires upon the right-of-way of the plaintiff. It is alleged that for portions of the distance the poles and wires are being put on the plaintiff's right-of-way and in some places to be thrown across such right-of-way. It is alleged that as the wires are being installed and under the high tension service contemplated, the service of the plaintiff's telephone and telegraph wires will be put out of commission by electric induction. It is alleged that as the wires are being constructed more than $3,000 damage will be inflicted upon the plaintiff.

The prayer of the petitioner is that a temporary restraining order be granted against the defendants and defendant's employes, and that upon hearing a permanent injunction be granted against construction or operation of the said electric lines as under alleged "unlawful and wrongful" construction.

Dakota Connection Case Progressing

Concerning the question of effecting physical connection between the Grand Forks, N. D., exchange of the Northwestern and Tri-State telephone companies which has been agitating the public of Grand Forks for several months, it is reported by Alderman W. S. Whitman of the council committee, that good progress is being made —in fact, Mr. Whitman said, the "negotiations are progressing most satisfactorily."

"Mr. Pratt, the general commercial superintendent, with Mr. Wilson, the commercial superintendent, Mr. Prendergast, general counsel, and other representatives of the Northwestern Telephone Exchange, met with the members of the committee on January 3, for a conference, at which was discussed the situation in all of its details," says Mr. Whitman.

"On the next Monday, January 5, Mr. Randall, the secretary, and other representatives of the Tri-State company, also met the committee in conference.

"As a result of both conferences, the committee has every reason to believe that connection between the two exchanges for all toll business, both inter and intra-state, will be accomplished without litigation and upon rates which will compare very favorably with those allowed by the railroad commissioners in both Minnesota and Wisconsin after litigation; in other words, the people of Grand Forks will obtain without the expenses, delay and annoyance of litigation the same service from the connected exchanges that was obtained by Owatonna, La-Crosse and other cities, and at rates even more favorable.

"The proposed resolutions to be adopted by the city council and the agreements in accordance therewith have been prepared by City Attorney George A. Bangs, and have been submitted to the companies, the Tri-State company has already expressed its approval thereof and the delay on the part of the Northwestern Exchange Company has been occasioned by the absence of Mr. Pratt.

"The Northwestern Exchange Company has not yet expressed its agreement to connect for inter-state toll business, but the committee has every hope that it will meet the concessions of the Tri-State company and the desires of the people which will result in the connection of the exchanges for both inter as well as intra-state toll and long distance messages."

Garden Plot for Southern Bell

J. Epps Brown, first vice-president of the Southern Bell Telephone Company, announces that the Telephone and Telegraph Society has secured two acres of ground at Stewart avenue and Dill street, Atlanta, Ga., for its Victory garden, which will be tilled by the company's employes in their concerted efforts to increase food production.

Mr. Brown also announced that the Southern and the Cumberland Telephone companies are trying to aid their employes in every exchange to secure and till Victory gardens.

The recently secured Atlanta tract of land will be plowed by the International Harvester Company with one of its tractor plows. A. H. Leimbrook, Atlanta branch manager of the International, promised the Western Electric Company also to break the ground in its Victory garden in the same way.

Buying Goods Quoted by Mail

When You Can Depend on the Quotations

BY ELTON J. BUCKLEY

AN interesting case has been decided by the Appeal Court of Pennsylvania touching a legal complication which may arise when goods are ordered or buying contracts made by mail. The law as laid down by the Pennsylvania court would be the law practically everywhere in the United States.

On July 20 a New Jersey concern called the Bruner Company wrote the Standard Company of Philadelphia, asking for a price on certain merchandise delivered in Ocean City, N. J.

On July 22 the Standard Company answered, quoting price and stating when it would ship.

On July 25 the Bruner Company wrote again and further discussed the matter, mentioning the Standard Company's quotation and terms.

On July 30 the Standard Company replied, stating: "You understand correctly our quotation."

On July 30 the Bruner Company wired the Standard to enter an order for a certain portion of the goods, but said, "Hold for final confirmation before commencing packing, as we are awaiting the signing of contract." The Standard Company made no reply.

On the same day the Bruner Company wrote the Standard Company as follows: "We have been given a promise of this business under the condition that it is held open until the contracts are signed between the city and our customer, as we believe the state law requires a certain time to elapse between the receiving of the bids and the awarding of the contract, so that unless something unforeseen arises, we will send you a formal order at that time." The Standard Company did not reply.

On August 8 the Bruner Company wrote the Standard, stating that the matter was progressing satisfactorily and that it expected, "sometime next week," to send the formal order. The Standard Company did not reply.

On August 11 the Bruner Company wired the Standard that it had "finally secured order. Enter our order and commence packing immediately. This is in accordance with our conditional order accepting your quotations on this inquiry."

On August 12 the Bruner Company mailed the Standard a formal order, stating: "This is in accordance with your quotation of July 22, and your subsequent letter of July 27, replying to ours of the 25th ult., telling us we understood your quotation correctly. This confirms our conditional telegraphic order of July 30, in which we instructed you to hold for final confirmation before you commence packing, and our telegram yesterday, telling you we had finally gotten this business closed."

On August 12 the Standard Company wired the Bruner Company, mentioning a letter which the Standard said it had written on August 11, stating that it could not longer keep the quotation open as it had sold so much of the same goods to other people.

When this was recevied the Bruner Company wired back: "Sorry your telegram even date arrived too late, as we had already closed order with customer on basis your price time of shipment. Your letter of eleventh not received."

From that time on there were letters and telegrams back and forth, the Standard Company refusing to furnish the goods and the Bruner Company demanding them. The Standard Company persisted in its refusal and the Bruner Company finally went out and bought the goods somewhere else, but at an advance of $964.13. To recover this it sued the Standard Company and the case was bitterly fought up to the Appeal Court. The Bruner Company won hands down.

The question involved will touch any business man, seller or buyer, who deals with anybody in the purchase of goods, by mail. It is this: Where a seller has quoted a price to a prospective buyer by mail or by telegraph, how long does that quotation remain open, and when must the seller retract or withdraw it in order not to be bound by it?

The answer is that such an offer is good until it is withdrawn, and if the buyer *mails or wires* his acceptance before he has received notice of the withdrawal of the quotation, the seller is bound even though he has actually mailed or wired his withdrawal before he received the acceptance. The reason for that apparently contradictory situation is that an acceptance is good from the moment it is despatched, whether by mail or wire, while a *withdrawal* is not good until it actually reaches the other party.

From the court's decision, awarding the Bruner Company damages it contended for, I take the following:

First.—Was there a binding contract between the parties? There was a definite offer by the Standard Company to furnish the merchandise at a certain price. The Standard Company was fully advised as to where the merchandise was to be used and of the delay which would occur before the matter could be finally closed, and that the Bruner Company intended to enter into a contract on the faith of its quotations. The quotation was to remain open and until the Standard Company advised to the contrary, the Bruner Company had a right to rely on the offer made. That this was the intention of the parties is shown by Standard Company's letter of August 11 stating that it could not hold open the price any longer and this language is repeated in the letter of August 17.

There is only one conclusion to be drawn from the pleadings and that is that the Standard Company held the order awaiting the Bruner Company's final confirmation of it, and that if the final confirmation came to the Standard Company before it had withdrawn its quotation, it is bound.

Was the revocation of the offer effective or did it come too late? While an acceptance is complete where a letter is deposited in the mail, a retraction of an offer can have no effect until it is communicated to the person to whom the offer is made and the revocation can take effect only if it is communicated to the other party before its acceptance. An offer to contract, communicated by post must be considered as continually made until it reaches the other party. If he accepts before knowledge of a retraction of the offer, the contract is binding. The letter of August 11 written by the Standard Company to the Bruner Company retracting its offer was not received by the Bruner Company until August 14. On August 12 the Bruner Company received a telegram from the Standard Company withdrawing its offer. It therefore appears from the pleadings that the Bruner Company accepted the Standard Company's offer by telegram on August 11 and that this acceptance was received by the Standard Company before it telegraphed a revocation of its offer, and before the Bruner Company had been notified that the offer had been withdrawn, it accepted the contract and the revocation came too late.

This is a pretty important case, especially when quo-

tations are soaring and sellers are withdrawing from the market. Wherever it is practicable to do it, it is best to withdraw an offer *by telephone*. Even that would not be a good withdrawal, however, if the buyer had mailed or wired his acceptance before he was called up. Many concerns get around this by adding the following: "This quotation good only to 12 o'clock Monday, April 8." A quotation given in that way automatically expires at the time set, and doesn't have to be withdrawn.

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Chicago Girls for France

Over the vitally important war telephone lines of the United States army "over there" soon will echo the voices of Chicago girl operators.

A number of these girls are finishing intensive training for the work at a suburban station of the Chicago Telephone Company. Within a short time they will depart for the east and a ship bound for France.

Among the young women are Misses Marjorie Thomas, Drucilla Palmer, Louise Beraud, Mellicent Martin, Annie L. Gernon, Lillian R. Verkler and Evelyn Thomas.

The first requisite of a volunteer is that she speak French fluently. Five of the seven named have lived in France from two to five years, and the two others studied the language at the University of Chicago.

In France they will be the only women to wear regulation uniforms, with hat cords and arm brassards.

Evidence of their patriotism in volunteering for the service is offered by what they are giving up here.

One surrenders a position with a real estate firm paying more than most men of her age earn; another an established studio of art; one a lucrative private secretaryship, and another her seinor year at the University of Chicago, with private tutoring engagements.

"We are fitted for the work, and want to do our bit," they say.

As previously announced, the Signal Corps is making a call for girls to go to France. Here is a sample of what the American operators may hear:

"Les deux fils sont en contact; isolez No. 1, ferons de meme ici; nous permettra employer fil No. 2 en attendant enlevement du contact."

Meaning in wire parlance:

"Both wires in contact; free No. 1; will do same here. This will enable us to work on wire No. 2 while defect is being removed."

And the girls must learn that to "faire un branchement" is to tap a wire, and many other things that don't come through the local exchange on ordinary days. The American telephone lines in France not only connect the military forces of this country but connect directly with the French government system, and unless the operator has a very good stock of French she need not try the job.

The Government wants girls who have resource and initiative, who could "go it alone" if need be, and over a hundred girls have already been accepted for the work. As fast as the girls can be found they will be trained, either at home or in some training center and then sent over to help win the war.

The girls will wear a uniform prescribed by the War College, and they will say farewell to all other kinds of dresses from the day they start work until it's over Over There. Operators will wear a white brassard with a black telephone transmitter on it. Supervisors will have a gilt laurel wreath under the transmitter, and the chief operator will have in addition the gilt lightning belts of the Signal Corps. Operators will get $60 a month, supervisors $72 and chief operators $125. Rations and quarters are to be given in addition to the pay.

All chief operators in local telephone exchanges will give information to applicants, and blanks can be procured for application from the Chief Signal Officer of the army, Room 826 Mills Building Annex, Washington.

Organize Mutuals in Iowa

A telephone meeting in Montezuma, Iowa, February 11, was held in response to a call by Chairman G. W. Hawkins. Most of the mutual or farmers' lines in the county except those in the northeast part were represented.

The meeting, the chairman announced, was called to ascertain the feeling of telephone subscribers regarding the recent levy of toll charges from Montezuma to Grinnell and Malcolm. A number of those present, representing different mutual lines, made short talks explaining their position. In some instances mutual meetings had been held and the representative instructed to say that they were in favor of a county wide mutual system, unless toll charges are rescinded.

As a result of the discussion and exchange of views an organization was formed with the following officers: President, G. W .Hawkins of Montezuma; vice-president, J. P. Marvin, Malcolm; secretary, Sam P. Tish, Grinnell; treasurer, J. W. Scovel, Deep River.

One director from each township was also elected. Those on the directorate are: George Baustain, Malcolm; Hiram Eichhorn, Pleasant; William Fish, Deep River; W. J. Sharrar, Jackson; Frank Wesco, Chester; Arnold Latham, Sugar Creek; Henry Shultz, Sheridan; Charles Cessna, Grant; William Bolen, Madison; Fred Ewing, Scott; T. H. Miner, Lincoln; Emory Holly, Bear Creek; Ernest J. Harris, Washington; Jacob Slaymaker, Warren; Benjamin Grier, Jefferson; John Steele, Union.

The officers and directors met again February 18, at Malcolm to perfect the organization.

Those present expressed themselves as willing to go into a mutual organization and to place exchanges in the towns in the county where tolls are charged. It is pointed out that country lines running into Grinnell are farmers' or mutual lines and that a large number running out from other towns are farmers' lines.

Newberg representatives were also present and urged a new organization. A number of those present expressed the belief that plenty of money could be secured to install new switchboards where necessary.

An enthusiastic meeting was held at Mt. Pleasant, Iowa, where delegates of all the Farmers' Unions of Henry county met together to discuss the question of telephone rates.

The farmers of the county are positive that the present rate must remain the same or something will be done by the Farmers' Unions of Henry county. A committee was appointed to look into the matter.

Manager C. W. Quillen, of the Mt. Pleasant Telephone Company, was at the meeting, by the invitation of the farmers, to explain to them the telephone company's side of the question.

C. C. Deering, of Des Moines, secretary of the Independent Telephone Association, was also present. He made a speech to the assembly and urged the farmers to arbitrate.

It is understood that the farmers are planning to establish a telephone service of their own, if the present company does not agree to leave the rates at the present figure. It is said that plans are already under way for the organization of a company and that competing lines will be run through the county.

Simultaneous Telephone and Telegraph

"Telephone Talk" Describes the Double Use of Wires at Vancouver

ANYONE entering the Seymour office at Vancouver would at once be attracted by the familiar tick, tick, of the telegraph instruments, coming from the direction of the rack room. In blueprints, official documents, and perhaps by the apprentice who is reading his first book on telephony, this room referred to as the terminal room or apparatus room, but it is more commonly known as the rack room. Operators and others (that is, operators who have sacrificed their beauty sleep and do not require to run up the stairs three steps at a time, their hat in their hands, hat-pins in their mouth, and wondering whether it is their wrist-watch or late cars that have have to shoulder the blame for the day) will instinctively turn their heads towards the door of the rack room and wonder what it is all about. It is the purpose of this article to tell as briefly and as non-technically as the professional jealousy of the plant man will allow, what it is all about.

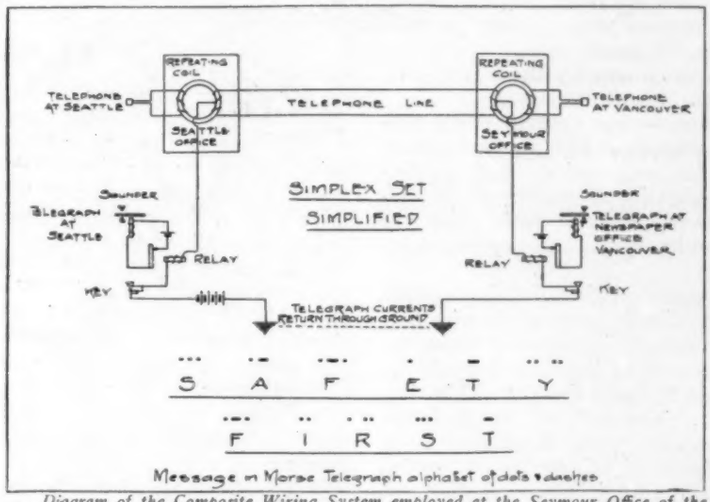

Diagram of the Composite Wiring System employed at the Seymour Office of the British Columbia Telephone Company, Vancouver, B. C., Canada, for Simultaneous Telephone and Telegraph Work.

When you read your newspaper in the morning or in the evening you little realize that most of the news from the various battle fronts has for a large part of the way been telegraphed over telephone wires. Moreover, both the telephone and telegraph have been operated simultaneously without interfering with one another. You may be talking with your friends in Bellingham, Seattle or Chicago over the telephone, and at the same time momentous news from all over the world may be coming over the same wires by telegraphy. By suitable equipment at the telephone terminals, it is possible to send four telegraph messages, two in each direction, and one telephone message over a single telephone circuit at the same time without any one message interfering with another. This is made possible by means of what is known as derived circuits. The system of connection of the principal and derived circuits and of the instruments working upon them is such that the instruments of the telephone circuit are unresponsive to currents flowing from the telegraph circuit, and the instruments of the telegraph circuit are unresponsive to currents from the telephone circuit. For instance, a condenser will allow the alternating currents produced by the voice to flow through it, but will effectively stop a flow of the direct currents that work the telegraph instrument. Likewise, a specially constructed coil will serve to choke or stop, a flow of alternating current, but will allow direct current to flow through it with little if any interference. A coil of this type is called a retardation coil. The condenser, as well as the retard coil, is used in composite sets, and makes possible the successful operation of two telegraph circuits over a telephone line, since direct current is used for the telegraph circuits, and voice currents form high frequency alternating currents.

The accompanying rough sketch of the very simplest form of derived circuit, known as a simplex set, will serve to illustrate the principle. This shows a telephone and telegraph circuit working simultaneously over a single pair of wires, the telephone circuit being a metallic circuit, and the telegraph circuit being a grounded or earth return circuit —that is, the currents return through the earth instead of a wire. The telegraph circuits need not be on the same premises with the telephone equipment. From Seymour office the line is extended to the newspaper offices and to the *Canadian Press*.

Argues for Higher Rates

Vice-President J. E. Farnsworth of the Southwestern Telegraph & Telephone Company presented his explanation for the proposed change of telephone rates in Fort Worth, Texas, in an address at the weekly luncheon of the Ad Men's club.

"The alternative existed," explained Mr. Farnsworth, "of allowing our system to become congested and our service to break down, or, before this condition reached an acute stage to take the public fully into our confidence and lay all our cards on the table, face up.

"We felt that it would be much to our advantage and to the advantage of subscribers if we could sit down with representatives of the city of Fort Worth and find the right solution for our common problem.

"This was upon the theory that we must find the right telephone rate—the one which would produce for us the necessary revenue and at the same time be low enough to hold our subscribers."

Mr. Farnsworth explained the attitude of the company at length and closed his address with an appeal for what he termed the "unprejudiced consideration of the problem."

"We want the public to understand," he asserted, "that we are not taking advantage of war conditions to ask for higher rates. We had no other recourse if we were to remain true to our public obligations than to explain the situation and offer our remedy. Otherwise we would have been before you in a few months with futile and useless explanations."

Electrolysis and the Telephone Plant

A Paper Read Before the Efficiency Club at Dallas, Texas

By J. B. BLOMBERG

ELECTROLYSIS, as applied to the telephone plant, is the gradual eating away of a substance by the passage of an electric current from it.

In most cities and towns having electric street railway systems or other direct current lighting and power systems using the ground for one conductor of the distributing system, the lead sheaths of underground telephone cables and the anchors on aerial cable leads are destroyed by electrolysis, unless precautionary measures are taken to prevent it.

In practice the only sources capable of doing serious damages are single trolley direct current electric railways. In these railways, current is supplied from the positive terminal of the dynamo to the cars through the overhead trolley wire, passes through the car and is then returned through the track. The rails of the track are bonded across the joints so as to make them electrically conductive. In the neighborhood of the power station the tracks are connected to the negative terminal of the generator and this completes the electric circuit. The tracks are usually in contact with the ground and since the earth is a conductor of electricity, current will leak from the rails to earth and flow through it. Such currents are usually called stray currents.

The sheaths of underground telephone cables are normally of a very low resistance, frequently less than one ohm per mile, and these stray currents are therefore liable to flow through the cable sheaths, to a considerable extent, depending upon the resistance of the earth and other nearby structures, such as water and gas pipes.

Since electric current can flow only in a closed circuit, all stray current which leaks from the rails and flows to ground, and thence to the sheath of underground telephone cables and other metallic structures, must again leave these structures in order to flow back to the negative terminal of the generator so as to complete the electric circuit. This is usually in the neighborhood of the railway power stations, although it may be at various points, depending upon the system of negative feeders used.

Electrolysis corrosion manifests itself in a characteristic pitted appearance on the lead cable sheaths or the anchor rods as the case may be. As mentioned above, the action occurs at points where the stray currents leave the cables and these points are said to be electro positive to earth. Points where the stray currents flow on to cables or anchors are said to be electro negative to earth. Unless large currents are involved this latter condition is not particularly harmful except that all the current picked up must be disposed of at other points.

As electrolysis is due to passage of the stray currents from the cable sheaths or anchor to the ground, it is obvious that the underground cables may be protected by either preventing the current from leaving the sheath or anchor and going to the earth. Different means of both methods are in use. To prevent the current from entering, strain insulators in the guy strands or other equivalent in construction methods, insulated joints in cable sheaths, better street car track bonding, etc., may be employed. In preventing the stray current from leaving the sheaths and going to earth the most widely used and perhaps the most successful method is that of draining the currents and returning them to the negative terminal of the railway generator by means of copper conductors connected between suitable points.

Generators furnishing power for street railways and using ground as one side of the circuit should have the negative terminal connected to ground. With the negative side of the generator grounded the electro positive areas are confined to a limited part of the system which can be readily located and are more easily watched and more successfully treated. If on the contrary the positive side of the generator is grounded the electro positive conditions will generally be distributed over the entire system and the farthest point from the power house is usually where the worst conditions will exist. With this scheme the conditions will be constantly changing and it is very difficult and prarctically impossible to mitigate the effects of electrolysis.

The existence of the dangerous conditions where the current is leaving the cable sheath or anchor is readily determined with the aid of a low reading volt meter. Usually the cables are tested at all manholes, the volt meter being put in series with the cable sheath and the ground in the bottom of the manhole. This will indicate the direction of flow as well as the difference of potential. All readings where the current enters the cables are recorded with a minus sign, and those points where the current leaves the sheath are indicated by a plus sign.

In conjunction with the test mentioned, is is also desirable to obtain the difference of potential and directions of current flowing between the cable sheaths and any adjacent water mains, gas mains, street railway tracks or other grounded metal structures. It should, however, be clearly understood that these readings are only of importance in serving to illuminate the situation as a whole.

As a means of showing at a glance the electrolytic conditions of the underground cable system, and a satisfactory means for studying the situation as a whole, a skeleton map of the system showing all manholes is of decided value. It is also essential that all elements influencing the electrolytic conditions be noted. This will include a knowledge of power house locations and negative feeders, location of tracks, and the time of day during which each power house is in operation. The location of large water or gas mains may also have some influence and these should be noted.

The study of the map previously referred to on which the readings at manholes are recorded will most frequently show that the points where the potential of the cable sheaths is electro positive to earth are in groups and most generally near the power house. If return feeders are used by the street railway system the positive areas might in this case be where the outer end of these feeders connect to the track.

In most cases there will generally be one or two manholes of higher potential than the others in a group of positive manholes. It is true that the conditions of potential recorded at various manholes do not accurately determine the amount of current flowing on account of the readings depending on the conditions of the ground

used when taking the readings, yet it is practically safe to assume that the manhole showing the higher reading is about the center of the trouble.

In the drainage method of mitigation, a path of sufficiently low resistance should be provided from the cables to the negative terminal of the railway generator so that all the current will pass through this path instead of passing to earth. In other words, the method consists of providing a path low enough in resistance to change the potential of the cables relative to the earth from an electro positive condition to an electro negative vondition. This path is provided and the desired results accomplished by connecting the sheaths of the cables with the negative terminal of the railway generator by means of a suitable conductor.

It must be large enough to bring about the desired results, that of rendering the exposed district electro negative, yet not so large as to invite an excessive amount of current flow through the sheaths. It is also of the utmost importance that no connection be introduced that will invite current onto the cables by giving it a better path for return. With very large currents flowing into the sheaths there is danger of overheating. In the underground cables there is also some danger of injury to the cable sheaths from the action of the alkaline substance formed about the cables through the decomposition by the current of the soluble salts contained in the surrounding earth. These alkaline substances are capable under favorable conditions of attacking the lead when the currents are off or very much reduced, as would be the case at night. For these reasons the resistance of the conductor placed between the cables and the negative terminal should be just low enough to bring about the desired electro negative relation, otherwise it would be a source of positive danger rather than benefit.

The size of conductor to give this electro negative condition should be determined by calculations based upon certain measurements that must be taken. These measurements may sometimes be quite extensive and require considerable time, therefore, where the drainage connection is only a few hundred feet it will perhaps be more economical and probably as satisfactory to install a large gauge copper wire and re-test the affected district to see if the desired results have been accomplished. In other cases a trial connection consisting of a small gauge copper wire may be installed and the effects of it observed, after which the size of a permanent wire may be determined.

It is often convenient to use the sheath of aerial cable as a return for stray currents which, of course, results in considerable saving. When used, precautions should be taken that the cable sheaths are not overloaded, thus producing undue heating of the sheaths, and the amount carried should not exceed the amount in amperes for the various sizes as follows:

25 pairs	22 gauge	40 amperes
50 pairs	22 gauge	50 amperes
100 pairs	22 gauge	70 amperes
200 pairs	22 gauge	100 amperes
300 pairs	22 gauge	125 amperes
400 pairs	22 gauge	135 amperes
600 pairs	22 gauge	155 amperes
100 pairs	19 gauge	100 amperes
300 pairs	19 gauge	155 amperes

The amount of the current flowing should be measured when the railway load is at its highest peak.

Stray currents generally follow the sheath of aerial cables entering and leaving by means of the anchors unless the anchor guy wires are separate from the messenger strand carrying the cables. It is sometimes desirable to prevent the current from entering, and in other cases prevent it from going to the ground. At some points on heavy leads a strain insulator may be inserted in the guy strand, thus breaking the circuit, or if desired, the guy strand may be separated from the messenger strand on the pole. In the newer construction this is usually taken care of by dead-ending the strands on separate strain plates.

In localities removed from the power house, where electro positive conditions exist, it is generally found to be an expensive proposition to install drainage wires and in such cases a ground plate may answer the purpose. These plates should be made either of cast iron or zinc. The undesirable feature in connection with this scheme is that the plates are gradually decomposed and therefore must be constantly watched in order that the dangerous condition will not be re-established without becoming known. There is also a possibility of local action between the lead sheaths and the buried ground resulting in destructive currents if the potential between the earth and the cable is low. For this reason the metal which is negative to lead in a voltaic sense should always be used for ground plates. Iron can be used if a potential between the cable sheath is more than three-tenths of a volt. In case of a lower difference of potential a zinc ground is preferable.

Insulated joints are frequently used in either preventing current from being picked up or leaving along a certain section of cable. This method is particularly useful where aerial cables dip and go underground when crossing street railway tracks or on account of other obstructions.

In larger cities it is usually the practice of the street railway company to supply current for the operation of street cars from one or more sub-stations in addition to the main power plant, each of which in this case becomes the center of a distribution district. The sub-stations are generally tied together so that the relative distribution of each may overlap, and the cars at any one point may receive current from more than one sub-station, and for other hours from just one sub-station. In such cases it is necessary to arrange the drainage wires in such a way that the telephone cables will be protected under all conditions. This may require running drainage wires to two stations, one of which may be shut down during certain hours or which may be carrying varying percentage of the street railway load. In the first of these cases the current may flow from the sub-station which is shut down, through the drainage wire and to the cable sheath, in the latter case, the current flowing in the drainage wire may be reversed in direction while both stations are running. In both of these cases it is preferable to install an automatic switch which has been designed for this purpose. The switch is arranged so that it will automatically open the connection when current tends to flow on to the cable sheath, and close the connection when the current tends to flow away from the cable sheath.

After the drainage wire has been installed a check test should be made to determine if the dangerous electrolytic condition previously existing has been eliminated. These tests should duplicate those made before the installation at such critical points of the underground cable system as will show the condition of the entire locality for which the protection was installed.

Tests should also be made to determine the

amount of current carried by the wire. For this test the use of a recording milli-volt meter is preferable and the method consists of obtaining the drop of potential over a certain length of the drainage wire. Knowing the resistance of the wire the current is easily calculated.

The above investigation should be made in sufficient detail to indicate all points where the current is being conducted to the cable sheaths, and where this condition can be relieved it should be done before any drainage wires are provided. Any contact between the cables and any other grounded metallic structures which are found to bring current on to the cables should be cleared.

Value of the Technical Man

In America the railroad which has reached the highest standard of efficiency and the largest earning capacity is the Pennsylvania, and it is a significant fact that for a long term of years its chief executive has been a civil engineer who has advanced through the successive branches of employment to the commanding position of president.

The policy of that great railroad has been to secure technical engineers for service in the various departments of the road and to have them apply their trained minds to the betterment of that branch of the service in which they may have been assigned.

This practice of the Pennsylvania company, however, is as exceptional as is the success of the company as a public service corporation. In too many instances railroads that have been built by engineers are, thereafter, operated and maintained by nontechnical men, men who in time have acquired the experience which has qualified them for their tasks, but that experience is obtained at the cost of the railroads, the engineers who have acquired fitness at their own cost being cast adrift to find new fields of service.

It is true that the railroads have found that, for self-preservation, they must have an engineering department presided over by an educated and experienced chief; but he is seldom adequately compensated for the skill he possesses and the heavy responsibilities which he must assume; and a tight rein is held upon the number and the pay of the technical men he is allowed to employ to develop his plans and carry them into execution.

It has taken a world tragedy, the tragedy of war, to arouse the nation to an appreciation of the value of its technical men. This great strife is not, as in other ages, a contest of brute force in which the bulkiest muscle is bound to win, but it is a battle of intellectual giants struggling for supremacy in destructive creation, and protective and defensive development. The civil engineer, the mechanical engineer, the electrical engineer, the mining engineer, the chemical engineer, the aeronautic engineer, the marine engineer—a great co-operative brotherhood working for peace and victory—have cast their skill, knowledge and effort into a crucible from which our country is drawing the metal from which victory will be fabricated and a world peace be secured.

The laborer is worthy of his hire and his hire should be a just reward for his work. That just reward the technical man has never had and we appeal to you to give it to him. He comes to you with no threat; he wields no "big stick," but he believes that a tribunal organized to dispense justice will dispense it because it is just and not because it is extorted.—A letter from the American Association of Engineers to the Railway Wage Commission of the United States.

Mountain States Earnings Good

Mountain States Telephone & Telegraph Company gross earnings for the calendar year 1917 totaled $10,352,652.23, compared with $8,899,584.10 in the preceding year, an increase of $1,453,068.13. Total net operating revenues amounting to $3,471,843.75, against $2,969,148.61 in 1916, a net gain of $502,695.14. Dividends of $2,391,802 were paid during the year, an increase of $22,846.25, leaving a $62,000 balance to surplus.

These figures were reported to stockholders at the annual meeting in the company's Denver offices.

Two changes were made in the board of directors, H. M. Porter succeeding L. C. Phipps, Jr., who has gone to war, and Milton Smith, general counsel of the company, taking the place of W. S. McCornick of Salt Lake City. The other directors are E. M. Burgess, Denver; E. B. Field, Denver; Edward B. Field, Jr., Denver; W. L. Graham, Pueblo; Crawford Hill, Denver; A. V. Hunter, Leadville; Ed. S. Kassler, Denver; C. W. Nibley, Salt Lake City, and Theodore N. Vail, New York.

The new board renamed officers as follows: E. B. Field, president; Edward B. Field, Jr., first vice-president and treasurer; E. M. Burgess, second vice-president and general manager; J. E. MacDonald, secretary; Roderick Reid, general auditor; Milton Smith, general counsel.

Physical progress during 1917 is indicated by an increase of twenty-one exchanges with a gain of 17,487 in total number of stations. Coincident with this increase in exchanges to total of 409 and of total stations to 301,648 there have been added 36,908 miles of exchange and toll wire, including 11,209 miles of underground wire and 8,797 miles of toll wire. There was in 1917 an increase of 153,134 in the daily average number of exchange messages. There was an increase of 800 in the average number of company's employes, who now number 6,644, and an increase in the payroll of $627,604.87 during 1917 over 1916.

Miss Escobedo, Trouble Shooter

The first woman "trouble shooter" on the Coast, it is claimed, is Miss Jessie Escobedo, a dainty 18-year-old brunette, who began this arduous work for the Home Telephone Company at Santa Monica after two months of preparation. Attired in overalls of the most workaway fashion, the young woman is prepared to take a hand at repairing telephones in the shop, to start out with a motorcycle to make repairs at the top of the tallest pole, or to install an instrument in a home or office.

Miss Escobedo is a native daughter and has completed her junior year at the Santa Monica High School. She has lived in the city. She intends to re-enter school next fall and by that time expects to have saved enough money to defray the expense of her first year in college.

The deft fingers characteristic of her sex have won commendation from the management for the manner in which she has performed intricate repairs on the mechanism of the automatic telephones.

The new trouble shooter began her apprenticeship at this latter work, under the tutelage of her brother, Trinidad Escobedo, who is in charge of this department of the company. She also had to take her turn in answering complaints and in making repairs on the switchboard. She at once insisted upon donning a pair of her brother's overalls, as skirts were too voluminous and hindering for this kind of work. She has been wearing overalls while at work ever since, and now can boast of several pairs, all her very own.

Steps to Victory

A Brief Discussion of the Things To Do and the Things To Do Without

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I SUPPOSE not many fortunate by-products can come out of a war, but if this country can learn something about saving it will be worth the cost of the war; I mean the literal cost of it in money and resources. I suppose we have several times over wasted more than we are now about to spend. We have not known that there was any limit to our resources; we are now finding out that there may be if we are not careful.—WOODROW WILSON, *President of the United States.*

FOR every American enlisted to take active part in the present war, fifty Americans remain at home. How can these fifty, month in and month out during the war, help the nation take the steps necessary to victory?

The question of the supreme duty of the citizen not called to military service is one that every true American has asked himself many times. "I want to show my devotion; I want to express my patriotism in some tangible form," is a statement we all have made.

In seeking out hard tasks to perform, some of our citizens have, indeed, found an expression of their patriotism in duties that are proving of inestimable service to the nation. The tremendous progress in our war-advancing activities is evidence of that.

All of us have not found the opportunity to undertake hard tasks, however, and in looking toward them from a distance we have felt constrained to ignore the small tasks at hand, because they were, seemingly, so insignificant. Yet, after all, it is in the performance of the relatively small and simple tasks that the majority of us will have to be content in carrying out our part of the war.

It is a broad statement, yet a true one, that America's first great victory will be won when the personal advantage and the personal privilege of each of us have been submerged in unselfish devotion to the common cause. This first great victory will be won, then, when we have determined for ourselves the degree in which we shall recognize two fundamental duties that rest upon us, duties of regulating in our individual lives the

Things to do
and the
Things to do without
during the progress of the war.

Thousands of men and women, if age and sex permitted them to go to the front, would serve as well as any who have already gone. Love of country would on the battlefield find in them its highest expression. But because they remain at home, and because they do not wear the badge of service, their own part in the greatest contest ever fought by the nations of the earth has not been brought directly home to them.

It is not a very heroic part to play, determining for oneself the things to do and the things to do without in war-time. Heroic or otherwise, the determination must nevertheless be made. So it rests upon us at home to make the determination. This war will not be won by the naked bravery of those who carry our colors to France; he is lacking in imagination, and in knowledge of economic facts as well, who fails directly to associate the elements of business and financial life with the vital elements of the war. The strength and prowess of individual combatants counts, but there never was a time when war's success depended so much on the organization of the economic resources of the nations engaged.

The sort of valor that is required of us in the performance of our duties at home ought not to be a very great strain on our patriotism, particularly when we come to appreciate how much this sort of valor has its definite place in the war. As compared with the past, the difference of modern warfare is after all only a difference of degree. In the primitive state of society the duty of those who stayed at home was perhaps more directly apparent than today; when a tribe made war every man, woman and child underwent hardship in order that the fighting men might be fed and armed.

Modern warfare requires an indefinitely larger number of things than did the tribal warfare, but because its wants are supplied by industries wonderfully organized, individuals sometimes think their part not worth reckoning. Their part is most decidedly worth reckoning. There are three ways in which it is to be applied:

By Rigid Economy.

The war is going to call more and more for thrift and for an elimination of waste that will enable us to give our men at the front the support they need.

By Careful Saving.

Saving will be called upon more and more to supply the capital with which the Government can carry on the war.

By Hard Work.

The war is going to be fought more and more with the output of the industrial establishments of the country.

Never before were economy, saving and work so necessary. As time goes on they will increasingly be recognized as the basis for winning the war. Our soldiers and sailors alone cannot accomplish the purpose for which they have enlisted. Our soldiers and sailors, properly backed by the people at home, will be an invincible force for victory and peace.

ECONOMY

War's consumption of goods is fixed by circumstances altogether beyond any individual's control. But an individual's capacity for producing goods, and at the same time an individual's needs, are not so fixed.

In adjusting our output of goods, it remains for us to adjust also our consumption, so that we may apply to war all that is needed. It is amazing how much we can accomplish, how far we can economize, and how much we can save if only we try. In Europe the nations have discovered in the potential and actual production, and in the thrift of the people, a means of meeting demands so vast that they were deemed three years ago absolutely beyond attainment.

We do not have to save on all necessities, except where those necessities are limited in supply and indis-

pensable to winning the war. Luxuries are the things we can readily curtail. Former President Eliot of Harvard prepared a table early in the war showing the annual expense bill of the American people for things they put into their mouths that are not bread. The bill was $3,915,000,000. Liquor, tobacco, candy, soft drinks, tea, coffee, patent medicines and chewing gum made up this total.

There is vast room for private economy in the United States. We all like the good things of life, it is true, and many of us have been accustomed to buy so long as we could pay. But that process needs to be changed; because a man has money is no longer a reason that he should spend it.

Our paramount duty is to deny ourselves that others may live and that we may gain victory. In the United States 35 pounds of cotton per capita are now required to make the cotton goods we wear in a year. In 1870 we used 11 pounds per capita. Our per capita consumption of sugar lately was 89 pounds a year. A generation ago it was one-half that amount. Economy that carries us back to the habits of our grandfathers will not hurt.

Of course, no one will dispute that a certain latitude must be permitted. We must be prepared for sacrifice. But sacrifice need not mean such a self-denial on the part of the American people as to be ruinous to business. Ill-advised and impetuous economy, meaning unemployment and closed factories, would be demoralizing. It is evident to every thinking man that business must be sustained, and the conversion of industry carefully brought about whereby the nation's energies are transferred from the satisfaction of personal wants to the satisfaction of the needs of the army and navy.

Sound business must be sustained if the nation is to be insured against economic instability. Furthermore, we ourselves must be sustained if we are to be kept efficient.

Pinching thrift that brings harm in its wake is to be avoided. If you do without certain necessary food your strength is impaired. If you do without warm clothing you pay a doctor's bill. Five cents on a street car may save you five dollars or five hundred dollars. The health of body and mind gained by proper recreation may be worth a great deal more than the money saved on the theatre-ticket or an automobile.

Sacrifice by any of us that means self-punishment would be ruinous in the long run; a starved mind or body, though it brought peace of soul, would not go far in contributing to win the war.

The kind of thrift that makes for serious depression in business activity and for personal inefficiency is wrong. Our supreme duty lies in keeping our affairs, our bodies and our minds vigorous and wholesome. If we are to have a long drain of war and are to emerge triumphant, our country requires of us commercial and financial strength, and moral and physical strength as well.

So, then, we can afford no negative economy on the part of the American people. What we can afford is a curtailment of all unnecessary spending, and a wise and wasteless use of our resources. Waste is an economic offense; it is designed to have ill effect on the nation, and mischievous effect on the character of the waster.

SAVING

In the period of the war there are two things to save. One is material. The other is money. Material not bought by a private citizen for his private use is left for use of the Government. Money saved by a private citizen, when material is not bought, and when that money is turned over to the Government, gives to the Government power to secure the material that is automatically released by the private citizen's saving.

Saving in war time is simply a diversion of the buying power of money from the individual to the Government. As a general proposition saving is a hard matter to define, for the application of the term involves certain contradictions. It is a familiar axiom that he who spends money wisely, saves, while he who saves money wisely, spends.

We cannot afford to argue *against* spending. The hoarder is a loss to the community and to himself. We can afford to argue *for* spending. Spending *for the war*. We need to save *money* when that means saving *commodities*.

Let us keep the distinction clear. Every dollar that is expended for any purpose is of course put in circulation. If it is paid for something needless it prevents so much labor or material or goods from being used for the nation's necessities. But if it is paid for something that is essential to the war it applies just so much additional support toward supplying the nation's necessities. A wise and courageous handling of the situation that confronts every man, woman and child of the nation will pay, both directly and indirectly. The curtailment of one's personal expenditures, when that transfers buying power from the individual to the Government, benefits the individual, benefits the Government, and benefits the people as a whole. For by that curtailment the individual has set for himself a healthier and saner standard of living. He has ceased competing with the Government in bidding for goods and for labor. He has surrendered something for others.

Thus, by patriotic service, he has effectually served to enrich himself, to check the rise in prices, to cheapen the cost and speed the progress of the war, to reduce the need for tax levies and bond issues, and to make life less of a burden for his poorer neighbors.

The concentration of energy for winning the war is the highest motive that can dominate our lives today. With this thought before us, we can, therefore, properly reduce our material wants to a minimum. We can save on our table. We can make sure that our clothing is no longer serviceable before we purchase more. We can economize in coal and light. Exactly as we save will there be more food, cloth and fuel for the uses of war.

WORK

The duty that rests upon each producer of the United States is to exert his greatest possible effort in turning out those things necessary for the war. What is required urgently is the product of our farms, mines, and shops. We are not all farmers and miners. Nor are all of us mechanics. But we all have our part to play in conducting business energetically and in doing our utmost to bring about a speeding of the wheels of industry.

The duty of the farmer, the miner and the mechanic is clear—just as clear as the duty of the soldier and sailor daring all things in the trenches and the minefields. That duty is to labor with more zeal than ever before. Food, fuel and machines are the present-day staples of war, and America's ultimate success or failure lies in the plough, the pick and the lathe.

This fact does not for an instant, however, modify the duty of the railroad worker or steamship man, the merchant, the banker or the clerk. It enlarges it. Every human effort is necessary henceforward to bring about a right distribution of the commodities used in warfare, and to promote the facilities for producing more of those commodities. The sum total of America's finished products are released, from month to month, by the pro-

ducers to the shipping men, the merchants and all the others, and the nation can afford no apathy on the part of these men in dealing with the responsibilities imposed upon them. An indifference to duty on the part of any one man engaged in commerce or finance will serve directly to weaken the nation in the task it has undertaken.

So, then, we are *all* called upon to augment our efforts, and thus meet the demands of a situation bigger than any present vision can fully comprehend. Hard work will supply and properly distribute the goods needed in this emergency. Every nation that has gone to war has had to speed up labor. Men left at home have had to take the place of those drawn away. They have had to work longer hours, and work faster than before.

It is an unsupportable fallacy that the business of peace can go on as usual under the superimposed burden created by the war. It simply cannot be done. We haven't the machinery and labor, and cannot get them. Our work, then, must be directed with one constant aim before us: the aim to do our utmost to win the war.

Our chief characteristic, as Americans, is unbounded energy. Properly directed, that energy will enable the nation to devote every available atom of its resources to the purpose for which those resources are enlisted. Enthusiastic application of this energy, becoming sporadic when the enthusiasm wanes, will not do. A steady and persistent application, becoming increasingly intense as the need increases, will do splendidly.

The war is not a side issue. It is the biggest and most serious thing America has ever faced, and in the crisis we must keep that thought constantly before us. The cost of the war to the United States is calculated at more than a billion dollars a month. This means that in turning our energies to the manufacture of war indispensables, a billion dollars worth of labor and materials must be diverted degularly, every month, away from the gratification of our personal needs and desires. A billion dollars equals 30 per cent of the American people's monthly income.

Can we effectively divert so large a percentage of our income to war purpose without application of every possible ounce of effort and self-denial? Hardly.

The experience of other nations must become the example of the United States, none the less because we have no other source from whence to draw our economic strength than from ourselves. Every particle of food, every bit of clothing, every rifle, gun, cartridge and shell used by our men abroad must be supplied from the United States. Our's is a stern obligation, the surmounting of which requires the support of every American citizen.

THE GOAL

The muscle and money that turn the wheels of industry, that support the soldiers, and that will bring victory in the end, must come from the great mass of the people. The United States is rich in resources. It is rich in man-power. It is richest of all in the spirit of its people. The people of the United States are awakening to their own great capabilities. Shown the need for supporting the war even beyond what they have already done, there can be no question of the response of the whole population.

Today the eyes of all mankind are directed upon us, "the eyes of the earth," as one of our statesmen has expressed it, "with hope and expectancy, the eyes of the military autocracy of Germany with outward contempt but inward fear."

Therefore, while carrying on the nation's war business at the highest possible speed, can there be any reason why we should not reduce our expenditure for things that do not promote efficiency in mind or body, and turn what we save into the Government purse? The man who believes in his country and in himself will find no hesitancy in making his reply.

Economy must be general, and all must save for victory as one man. All must work with a single object in view: the object of manifesting complete loyalty to and support of a noble cause. There is no one so poor that he cannot do his part. Thrift is called the foundation of the power of nations; as such it is absolutely vital to the welfare of the American people.

We must be ungrudging in what we do, for if our most bitter war experiences are still to come, only thus shall we have prepared for them. It is a keen incentive we have for economy, for saving and for work.

We are pledged to keep this incentive constantly before us, to hold ourselves steadfastly to it. *It is the incentive to win the war.*

Alexander Graham Bell

THREE WIZARDS called the lightings to their hands
And witched tthe world with wonder in all lands.
Morse, with a flower-touch, loosed the wigned word
To ride the wires until the world's end heard.
Marconi shakes the ocean of the air,
And sends out words into the Everywhere.
But Bell flings off the cipher and the sign,
And, with a cunning nearer the divine,
Lets out across the void man's living voice
To sorrow or rejoice,
Dispels the distances, shrinks up the spaces,
Brings back the voices and the vanished faces,
Holds men together though the feet may roam,
Makes of each land a little friendly home!

The wires are everywhere,
The tingling nerves of the air.
Be-netting cities, speaking for all hearts,
From floor to floor their whispered lighting darts
Looping the prairies, leaping hills and lakes,
Over the world their whispered lighting shakes.
They stitch the farms and link the battle-line;
They thread the Alps and down the Kongo twine;
They throb among the Pyramids, and speak
Where Fujiyama lifts her perfect peak.

A fable it will seem in years to come:
How Bell gave speech to spaces that were dumb.
A fable it will seem:
He was one man, the one man with the dream.
When youth was on his brow,
He was a conscript burdened with a vow:
He was a man constrained
To seek a vision that the world disdained,
A vision that called laughters to the lips,
Laughters more stinging than the whistling whips.

"Wither the spaces, speak across the miles?"
How could the wise ones cover up their smiles!
"Send out our syllables like flying birds?"
How could the wise ones frame their scorn in words!
But now the deed is done,
And cried before the footsteps of the sun.
Honor the man whose gift from the All-Good
Is shrinking earth into one neighborhood.

And so, great guest, magician of the voice,
We come to crown that gray head, and rejoice.
We gather here tonight
To glory a little in your life's long flight.
Take at our hands this humble wreath of praise
For all the toil and victory of your days.
Take this poor wreath: 'tis all we have to give
To those that nobly serve and nobly live.

—*Edwin Markham.*

New York Company Report

The New York Telephone Company earned, in 1917, a balance equal to $13.10 a share on the $125,000,000 capital stock, compared with $13.81 a share in 1916. The annual report showed total revenues of $62,961,006, compared with $57,005,565 in 1916. Deductions for taxes aggregated $5,496,626, compared with $3,420,572 the previous year. The balance available for common dividends was $16,377,490, compared with $17,265,000 in 1916.

The statement of the New York Telephone Company and associated companies, operating in the states of New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, West Virginia, in the District of Columbia, and in parts of Connecticut and Ohio, showed combined total earnings of $98,367,838, an increase of $9,540,416, compared with 1916. Expenses increased $11,645,839 to $78,766,303. Net earnings aggregated $19,601,575, a decrease of $2,105,423.

On December 31, 1917, the New York Telephone Company had 1,443,388 stations under its direct operation, an increase of 82,209. To assist employes in meeting the unusual conditions obtaining as to living costs the New York company and associated companies authorized increases in rates of compensation aggregating $3,377,788, benefitting 53,056 employes. Under the instalment payment plan offered by the Eastern group of the Bell system the employes subscribed $861,850 of the first Liberty Loan bonds and $884,050 of the second.

The New England Telephone and Telegraph Company reported a balance available for dividends equal to $6.71 a share on $61,256,800 capital stock, compared with $7.68 a share earned in 1916 on a $55,295,300 capitalization.

Telegraph Instruction

Among the most important requirements in the prosecution of the war is the rapid transmission of messages. And among the various methods used to convey them, one of the most important is the telegraph. Words of warning and instruction are constantly being sent over the battle fronts by this means, either by wires or wireless.

But to render the telegraph of greatest service, competent men must necessarily be trained in the art of handling the telegraph key. Many men are needed in this branch of the service.

The Goodyear Tire & Rubber Company, of Akron, Ohio, is one of the country's big concerns that has recognized the importance of training efficient telegraphers for the work that lies ahead. So this company has inaugurated a class in telegraphy, as a measure of co-operation with the government in assisting in the training of men who can fit into this service. The class is being operated in connection with the company's factory school, and is in charge of the company's wireless operator. The course that has been formulated covers a period of twenty weeks.

The Goodyear plant operates twenty-four hours a day in shifts of eight hours each, but the classes have been arranged so that every employee desiring the course may be accommodated, no matter what factory shift he may be working on.

This co-operative measure is but one of many that the company has put into effect to supplement the training of men for our army of democracy. These measures have covered a wide range of subjects, all of which have helped the men to obtain earlier promotion from the ranks than would have been possible without them. Two thousand men have gone out from this company's organization, many of whom have written that their chances for promotion had been greatly enhanced because of the training secured in the factory school classes.

New York Tapping Bill Disapproved

The committee on the amendment of the law of the New York City Bar Association disapproved of Assemblyman Leininger's bill making it a felony to tap telephone wires because it thought the bill not rigorous enough. In a bulletin sent to Governor Whitman and members of the Legislature the committee says that conversations over the telephone should be as safe from eavesdroppers as letters, as a fundamental principle of civil liberty and constitutional right.

The Leininger bill would make it a felony to use a device to overhear telephone conversations except on the written approval of the United States district attorney or by orders from an officer or member of the United States secret service. The committee urges "that no one should be permitted secretly or clandestinely to intercept conversations over the telephone."

Citizens Company Autos Damaged

Five automobiles, property of the Citizens Telephone Company, of Grand Rapids, Mich., were damaged in two mysterious blazes Monday night and early Tuesday morning, February 18 and 19. One machine, quartered in the garage in the rear of the exchange building, was discovered blazing at about 8:30 Monday evening. The fire department was called and extinguished it. At 2:40 Tuesday morning another fire was discovered within a few minutes after the night watchman had made his accustomed visit to the garage. At this time the blaze had a good start and before it could be extinguished four more machines were mysteriously damaged. Several explosions were heard during the progress of the last blaze. The origin of the blazes is unknown. Damage is estimated at $1,500.

New York Offers Instruction

In its course of advanced training in telegraphy and telephony the College of the City of New York has the co-operation of the Western Union Telegraph Company, the Western Electric Company, the New York Telephone Company, the American Telegraph and Telephone Company, the Kellogg Switchboard and Supply Company, and the Automatic Electric Company. Skilled engineers in these fields will do the work of instruction.

It is intended to fit men for positions with telegraph and telephone companies and to aid in advancement for those who already hold such positions.

The College of the City of New York is exceptionally well equipped with one of the finest telephone and telegraph laboratories in the country.

Government Offers to Operate

The government notified the Chesapeake and Potomac Telephone Company, Feb. 23, that if the company desired, it would undertake to take over the lines in the District of Columbia and operate them during the war at the present rates for service.

European Telephone Practice

Translations from the Foreign Press and Communications from European Engineers

BY FRED W. SHOLZ

CELLON AND CELLON VARNISHES FOR INSULATION.—Electrical constructors in some of the European countries have been obliged to unlearn a good many things and to look around for substitutes, when the usual materials were cut off by war conditions. This refers among other things especially to insulating materials. The use of iron and zinc conductors with insulation for the former bare copper wires meant demand for a larger amount of insulating material.

The necessity for a more abundant insulating material called attention to a material, which had been used to a very limited extent before the war, i. e., the so-called "cellon." Cellon differs from celluloid not only through its greater resistance to fire, being therefore preferable to the latter, but also through the fact that its many qualities can be varied within wide ranges. For example, cellon, which is as flexible as soft rubber, can be produced, and other types which have the hardness of mica or of glass. The hardness of normal cellon is somewhat near that of sole leather. With the hardness of the cellon its mechanical strength increases and also its insulating power. Tests with the latter gave these results with hard cellon.

Disruptive strength with thickness of cellon plates of 0.2 mm...13200 volt
Disruptive strength with thickness of cellon plates of 0.25 mm...15800 volt
Disruptive strength with thickness of cellon plates of 0.35 mm...22000 volt
Disruptive strength with thickness of cellon plates of 0.45 mm...25000 volt
Disruptive strength with thickness of cellon plates of 1.0 mm...26000 volt
Disruptive strength with thickness of cellon plates of 1.3 mm...31000 volt
Disruptive strength with thickness of cellon plates of 2.0 mm...35000 volt

Tests as to the heat resistance of hard cellon gave:
With a thickness of 0.2 mm. it began to get soft at 110°C.
With a thickness of 0.5 mm. it began to get soft at 125°C.

No change was noted after cooling. When heated to 180° the mass became so soft that it could be kneaded but showed no other changes; the melting point was 194° C. Tests at the testing station gave for a normal cellon of 0.75 mm. thickness, a strength of 286.6 kg./sq. cm. (3216.12 lb./sq.in.), an elongation of 55 per cent, a breaking length of 2125 m. (7012.5 ft.)

The same figures are also true for cellon varnishes, which can be used for coating wires for insulating purposes. Naturally only the harder cellon varnishes give these test results, while the softer varnishes give poorer results. But as the various species of harder and softer cellon varnishes can be put on the wires and electrical materials in various layers and will dry and form a uniform, cohesive coat, it is possible to obtain whatever results one wishes by combining cellon varnishes of different quality. For example, a wire which is exposed strongly to bending can be coated with a softer, more pliant cellon and this then protected by a second hard insulating layer with a great mechanical strength.

Cellon can also be mixed with other ingredients, such as pulverous or fibrous materials, with mica, asbestos, etc., and thus all kinds of qualities can be imparted to it. In this way the cellon varnishes differ materially from other insulating varnishes like rubber, shellac or linseed oil varnishes, as these cannot be changed in their nature. Wax will always remain soft and can be easily injured, gum remains stisky, drying only in thin layers, and shellac remains brittle, peeling off when the base on which it is coated is flexed. Cellon varnishes can be produced so thin that they act like a shellac solution, and so thick that they act like a gum or rubber paste. They can therefore be applied either by coating the material to be insulated, or by dipping it in the mass or by spraying it on the material.

They offer a great advantage in that they dry very quickly and a cellon coating equal to a coating of a 7 per cent gum solution will dry like a 60 per cent solution, leaving a layer of insulating material several millimeters in thickness. It is therefore possible to obtain, with a single coating of cellon, results which previously had to be obtained with the use of insulating cotton winding tape or silk fiber insulating tape.

There are three grades of cellon varnishes: 1. The soft cellon varnishes which form flexible layers and are well suited for impregnation of paper, tissues, wire windings and for production of water-proof, rubber-like coverings. Wires coated with this softer cellon remain flexible, are waterproof and are suitable for damp rooms. 2. The normal cellon varnishes correspond in hardness, after drying to the hard cellon plates from 0.1 mm. to several mm. thickness. The coatings are very tough, do not crack and cannot be injured even when struck with a hammer. They may be used as substitutes for asbestos, insulating cotton and silk, as they give excellent insulating results. The more viscous varnishes can be used for protecting parts of electrical machines exposed to oil, like oil transformers, as the cellon varnishes are both water and oilproof. 3. The hard cellon varnishes give layers of extremely high insulating value and of the strength of hard rubber. The thinner hard cellon varnishes can be used for the insulation of electrical parts subject to high tension current and for a protective coating of parts already once coated with the soft varnish. These hard cellons give a layer of several mm. thickness, which after drying has the strength of enamel.

For insulation of iron wire conductors, especially at those places where the iron wires are connected to the insulators, a cellon iron rustproof varnish can be used. This adheres very closely to bare metal parts and can be used as the basic coating before using one of the other cellon coatings.

All of the cellon varnishes dry without drying ovens and even in the cold air and are dry after a few hours—the more viscuous varnishes after several minutes. They offer the advantage of being resistant to attacks by most of the mechanical agents and of forming a firm, cohesive layer, no matter how many coats are applied. Where two conductors have been joined, they can be coated with cellon varnish and form a uniform whole, which is impervious to water and air and offers no opening for attack of the underlying conductors. These cellon varnishes have been used extensively in Swiss laboratories and electrical industries and have proved excellent substitutes for other insulating varnishes that could not be obtained.—*Schweizerische Elektroctechnische Zeitschrift.*

Motorcycles for New York Company

The New York Telephone Company sent in an order recently for 50 Indian motorcycles—making 100 new machines of the single-cylinder Powerplus type. The order for 100 cars covered a period of two weeks. Before accepting the cars they were put through a most grueling ordeal over snow-piled streets.

The Highest Line

Following experiments that have covered a period of a quarter of a century, engineers of the Mountain State Telephone and Telegraph Company have installed what they believe to be the highest telephone service line in the world.

On the Denver-Leadville toll route the company has constructed the section of the line that crosses Argentine Pass at an altitude of 13,200 feet. The pass is near the famous Georgetown Loop, one of the beauty spots of the eastern slope of the continental divide, about forty miles from Denver.

The newly built section is only one and three-tenths miles in length, and it is estimated the cost of construction was eight times the expenditure involved in laying the ordinary stretch of wire.

When the route was first established in 1899, connection across the pass was made by laying twisted wires along the ground. Later a submarine cable was laid. Transporting material for this cable from Georgetown to the top of the pass entailed great difficulties, it requiring twelve and fourteen horses to haul a wagon with supplies to the crest of the mountain. The animals suffered hemorrhages from the nose and throat similar to humans who become distressed at high altitudes.

Shortly after the cable had been completed "trouble" was of frequent occurrence, and investigation disclosed that "Coonies," a species of mountain rat, were enjoying daily feasts on cable insulation. Sliding rock and the alternate moistening and drying out of the cable also resulted in much damage.

The cable was finally abandoned and the twisted wire system had been in use until recently, when an aerial wire "lead" designed to withstand all climatic conditions, was installed at a cost of $12,000 for the distance of less than a mile and a half. The line consists of twenty-four poles and seventy-five special "H" fixtures, spaced sixty-five feet apart and supported by heavy anchors. Close to 100,000 pounds of wire is carried on these poles. All material for construction of the line has been chosen after an exhaustive investigation of wind velocities, temperatures and moistures encountered in the pass, and it is believed that the new line will give excellent service for many years without repairs being made.

Views of portions of the line across Argentine Pass are shown on page 109.

He Has Forgotten Dollars

Major Hirsch, former telephone expert, now in the service of his country. We give him his name, but there are 10,000 Hirsches who are thinking, working, living for the same cause that Hirsch, the former telephone expert and man of affairs well known in Lima, is thinking and working and living.

In an after-dinner talk this Major admitted that until last July he was working for dollars, chasing the dollar in fact; today he is working for his country. "Never shall I again think of a dollar until this job 'over there' is completed." That is the Hirsch spirit; it is the American spirit. It is the spirit with which too many of us have not yet been imbued.

The bigger the man, the nearer you get to the fountain head, the more serious this war looms. We are facing the crisis of the war—1918 will spell victory of democracy or subservience for you. This last means tribute to the Kaiser, the war-lord. Don't let a few bright sunshiny days drive from your mind that this is the most critical year in your life—that if our armies fail, you may, like the Frenchman, prefer not to see the end—prefer to die rather than become a slave to the European war monarch.

It is men like this Major Hirsch; men who have given up business preferment; men who have forgotten old conditions and are whipping into new conditions, that will save you and yours from slavery, if you can be saved. In return for their sacrifice, you can't do too much towards supporting the Hirsches—you can't save too much sugar, or meat, or pork, or bread. You can't subscribe to too many liberty bonds, or buy too many war certificates. If you gave six months of your labor you would not be giving one-half what men like the Hirsches give.

You must forget dollars and think of yourself as a leader in your neighborhood of that great American Army back of the lines—the Army sustaining the Army. —Lima, Ohio, *News*.

The Longest Aerial Cable

The New York-Albany aerial toll cable is the longest and one of the largest in the Bell System. When completed, it will be the main artery for speech between our largest city and the capital of the Empire State, and eventually will be extended to Chicago. It now provides more circuits than can be accommodated on seven of the heavy open wire long distance lines we are accustomed to see. It follows the east side of the Hudson River to a point near Poughkeepsie, where it crosses under the river, and then continues up the west side to Catskill.

From Beacon to Kingston the cable contains 212 pairs of wires and from Kingston to Catskill 206 pairs. The cable is 2⅝ inches in diameter and weighs about nine pounds to the foot. Each reel, containing from 600 to 700 feet of cable, weighed about three and one-half tons. Some of the cable was placed underground to protect it from damage from blasting in quarries and it was also laid under ground in places where the cable, if it had been run aerially, would have been so close to buildings as to be dangerously exposed to the hazard of fire.

About 24,000 feet of submarine cable for feeders were placed at Nyack, Highland Falls and Newburgh. Later, another submarine feeder will be placed between Athens and Hudson. At the present time, most of the poles needed to extend the line from Catskill to Albany are in place and messenger wire has been run over them to a point only a few miles south of the State Capital.

Building this cable extension required the setting of 1,800 poles, the construction of five miles of subway, the placing and splicing of 55 miles of cable and 72 loading pots, the use of a total of 125 carloads of material and negotiating with 511 persons to secure 378 right-of-way agreements. In one case, eight heirs to a piece of property had to be found, and in securing the right of way over the various lands touched by the line, persons in New York, New Jersey, Pennsylvania, Illinois and Arizona had to be reached.—The *Telephone Review*.

Texas Town Votes Merger

Denison, Texas, has voted in favor of consolidating its two telephone companies, favoring the Grayson company to operate the new system after merging. The total vote was 695, with the Grayson company receiving a majority of 514 over the Southwestern to operate the merged system. The Grayson company intends to have the lines consolidated at an early date.

Telephone Patents Issued Recently

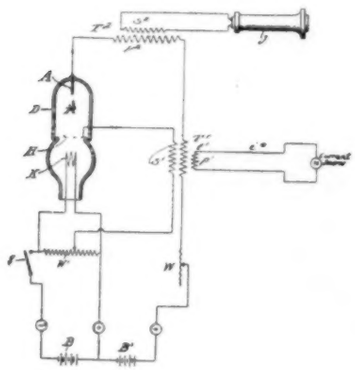
A Brief Digest of those Current Specifications Most Interesting to Telephone Men

BY DAVID S. HULFISH

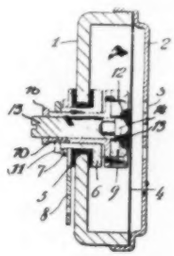
NO. 1,234,246. Searching System. Issued to J. L. Wright, assignor to Western Electric Company, Inc., New York, N. Y. In a searching switch in an automatic exchange, all trunks test busy artificially except the last idle trunk, so that the selection is limited to the last idle trunk of a group.

1,234,489. Speech Relay. Issued to E. Reisz, Berlin-Treptow, Germany. With a gas-discharge speech relay, a portion of the reinforced current is passed back to the exciting circuit to increase again the reinforcement. This is practicable only with relays which are without noticable inertia.

1,234,613. Transmitter. Issued to G. Boissonnault, assignor to Microphone-Detector Company, New York, N. Y. Carbon granules are held in a cup of which the diaphragm is the cover, and a carbon pencil projecting into the granules is adjustable from the back of the transmitter.



1,234,489.



1,234,613.

1,235,204. Transmitter Deadener. Issued to E. L. Holmes and Edward Jonhson, Jamestown, N. Y. When a ring at the base of the mouthpiece funnel is touched by the telephone user, the diaphragm is deadened to kill side tone in the receiver.

1,235,301. Measured-Service System. Issued to John Erickson, assignor to Automatic Electric Company, Chicago, Ill. (Application filed March 30, 1909). In an automatic telephone set, a meter must be operated to render the call sender operative. After a non-effective call, the ringing of the bell restores the telephone set to speaking condition without metering.

1,235,599. Operator's Circuit. Issued to F. N. Reeves, assignor to Western Electric Company, Inc., New York, N. Y. In a semi-automatic exchange, the operator has three process for connecting her telephone to a calling subscriber, and uses them in accordance with variant conditions.

1,235,705. Signal-Lamp System. Issued to A. E. Lundell, assignor to Western Electric Company, New York, N. Y. The A-operator picks up a trunk to B-operator by using an automatic switch; a lamp at the B-operator's plug-end glows steadily when the A-operator releases the switch, but flashes intermittently if the B-operator disconnect before the automatic switch shall have been released.

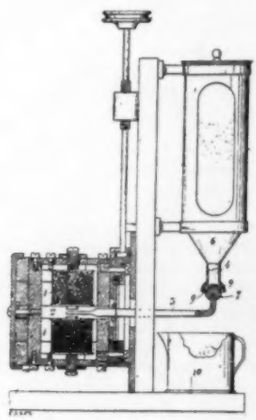
1,236,128. Speech Relay. Issued to D. P. Williams and John F. Williams, New York, N. Y. In a speech relay of the electromagnetic-and-variable-resistance type, the diaphragm is free and unsupported at the edges, and is associated with several receiving magnets and several carbon cells.

1,236,858. Meter System. Issued to T. G. Martin, assignor to Automatic Electric Company, Chicago, Ill. (Application filed May 6, 1910.) In an automatic exchange, the response of the called line reverses the current in the calling line, which reversal operates the meter of the calling line.

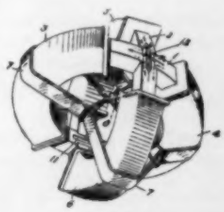
1,236,859. Limited Service System. Issued to T. G. Martin, assignor to Automatic Electric Company, Chicago, Ill. (Application filed October 21, 1911.) In a private branch exchange having a trunk line to central, some telephones may control central to obtain a connection, while others may not.

1,237,433. Automatic System. Issued to S. B. Williams, assignor to Western Electric Company, Inc., New York, N. Y. A single stepping relay operates over a non-speaking conductor to step all of the switches successively to adjust them for a conversation.

1,237,531. Searching Switch. Issued to A. E. Lundell, assignor to Western Electric Company, Inc., New York, N. Y. The contact points are arranged in a plane and the brushes hunt over an entire row of points in a reciprocating motion.



1,237,933.



1,238,153.

1,237,933. Microphone. Issued to Giovan Battista Marzi, Cornigliano Ligure, Italy. The microphone carbon supply is a stream of powdered carbon, and electromagnets control a valve for regulating the stream. The transmitter is designed for heavy currents.

1,237,998. Searching System. Issued to R. H. Burfeind, assignor to Automatic Electric Company, Chicago, Ill. When a telephone user has selected a group of trunks for searching and when all trunks of that group are busy, the selector selects another group before beginning search for an idle trunk

1,238,039. Trunking System. Issued to T. G. Martin, assignor to Automatic Electric Company, Chicago, Ill. (Application filed March 1, 1910.) Circuits are specific for impulse repeaters for trunking in an automatic exchange.

1,238,076. Callsender. Issued to A. H. Adams, assignor to Western Electric Company, Inc., New York, N. Y. When an even number is called, the impulses are of the same length; when an odd number is called the last impulse is longer than those which have preceded it.

1,238,106. Automatic Switch. Issued to H. P. Clausen, assignor to Western Electric Company, Inc., New York, N. Y. The brushes pass over the fixed tags by gravity, having release and stop magnets, and being subsequently restored by magnets and ratchets.

1,238,107. Callsender. Issued to H. P. Clausen, assignor to Western Electric Company, Inc., New York, N. Y. In spring-driven callsenders, the impulses are given more slowly as the spring runs down; this callsender has a brake which retards movement at first, thus attaining greater uniformity.

1,238,130. Restricted System. Issued to C. L. Goodrum, assignor to Western Electric Company, Inc., New York, N. Y. Positive and negative batteries are used, branch exchange lines which may use trunks to central being con-

nected to one battery and other lines to the other battery; a polarized relay operates to permit or to prevent the use of the trunk.

1,238,131. Callsender. Issued to C. L. Goodrum, assignor to Western Electric Company, New York, N. Y. A movable dial is back of the fingerholes and shows sometimes figures and sometimes letters through the holes.

1,238,141. Manual Trunk Signal System. Issued to E. E. Hinrichsen and L. H. Johnson, assignors to Western Electric Company, Inc., New York, N. Y. A manual trunk has at each end a mechanical signal with compound-wound magnet, and the connection of the trunk at either end displays the signal at the other end.

1,238,153. Phantom Loading Unit. Issued to G. E. Kellsall, assignor to Western Electric Company, Inc., New York, N. Y. A loading unit has intersecting core members with gaps at the intersections which offer different reluctances to the physical and phantom circuits.

1,238,162, 1,238,163 and 1,238,164. Automatic Switch. Issued to F. A. Lundquist, assignor to Western Electric Company, Inc., New York, N.Y. Brushes fall by gravity. When the brush engages a contact member of bar form it moves the bar out of the path of other falling brushes, causing the bar mechanically to test busy.

1,238,193. Selector System. Issued to J. N. Reynolds, assignor to Western Electric Company, Inc., New York, N. Y. A selector pre-selects a trunk and seizes the trunk when the selector itself is seized by a preliminary selector.

1,238,194. Automatic Switch. Issued to J. N. Reynolds, assignor to Western Electric Company, Inc., New York, N. Y. Trunk bars carry trunk contacts and line bars carry line contacts, and by the displacement of a trunk bar and a line bar at the same time the line is connected to the trunk.

1,238,265. Automatic Switch. Issued to H. P. Clausen, assignor to Western Electric Company, Inc., New York, N. Y. The callsender dial must be pulled twice for rotary movement and twice for vertical movement, the switch thus having a larger number of lines available without trunking.

1,238,350. Manual Operator's Telephone Connection. Issued to F. M. Slough, assignor to Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y. The operator's telephone is connected to the talking conductors of a cord pair through contact points of a relay, the relay having differential windings, one in a conductor to each of the plugs; when both telephones are off the hook the relay is released and the operator can not listen upon the conversation.

Wisconsin Has Good Meeting

The Wisconsin State Telephone Association, which held its ninth convention in the Hotel Wisconsin at Milwaukee, February 13, took as the keynote of its purpose —organization and co-operation. In order that the association may reach the individual companies and those companies may receive a return reward, plans are made to organize the state into fifteen districts.

In each of these groups officers will be elected which will enable the various districts to get in touch with each other. The definite aims and views of the association will be carried out through these groups.

Within the last year the idea of standardization of accounting procedure has been developed and the association is working to convince individual companies of the necessity of uniform accounting. An accounting department has been established at Madison under J. W. O'Connell, former member of the railroad commission. The companies are asked to tender a quarterly balance sheet to show the association how they stand. Uniformity of service given is one of the goals set.

W. L. Smith of Neillsville said the underlying principle of the association was to give the best of service to the public. He said the country needed the united efforts of all of its citizens and pleaded with the delegates to subjugate their individual interests to arrive at conclusions that would result for the best of all concerned.

President F. H. Runkel of Portage gave a short talk and George Balhorn of Milwaukee delivered a patriotic address.

A discussion of accounting standards was presided over by G. C. Mathews, statistician of the railroad commission.

Members of the association will try to induce the railroad commission of Wisconsin to raise telephone rates. Although the year has shown an increase in the volume of business, there has been an enormous jump in expense. The price of labor has risen, and wire and other telephone materials doubled.

James C. Kelsey, Chicago; B. E. Miller, of the railroad commission of Wisconsin, and E. K. Pier, Richland Center, addressed the convention.

The convention closed Thursday, February 14, after listening to more reports and discussions. Traffic studies, to determine the cost of conducting toll business, were conducted by H. E. McWethy of the statistical department of the Wisconsin railroad commission.

F. H. Runkle of the Portage Telephone Company was again chosen as president of the Wisconsin State Telephone Association.

H. H. Christofferson, Colby, was again named vice-president; J. A. Pratt, Menomonie Falls, second vice-president; W. F. Goodrich, LaCrosse, treasurer and J. A. Pratt, secretary.

The board's directors are: Walter Gallon, William Gieglow, E. K. Pier, in addition to the officers.

New England Embargo Off

Exchange managers of the New England Telephone & Telegraph Company are announcing that practically all restrictions have been removed which, since shortly after the declaration of war by the United States, have handicapped the installation of new telephones in the district.

For a long period would-be subscribers for telephone service have been put on waiting lists owing to the government's enormous demand upon manufacturers of telephone equipment. Cantonments, camps and new government buildings had to be wired and equipped with telephones at high speed, with the result that the market was swept clean of such supplies.

Later the need of copper for vast supplies of ammunition reduced the supply of copper wire to a minimum.

Now, however, much of the material has been turned back into its regular trade channels, with the result that the New England Telephone & Telegraph Company's clientele can be better accommodated.

The government's seizure of telephone equipment has not been entirely done away with, however, as was proven recently when a switchboard, arriving in Boston for a private concern was taken over by Uncle Sam.

In the main subscribers can be accommodated, however, with some minor limitations. The most important restriction still in force is that heavy wire can be secured only in limited quantities, and for the present none of the street lines and cables can be extended.

This means that persons living beyond the existing street lines must continue to wait, and new subscribers along lines filled to capacity must wait for telephones to be surrendered.

It also means that persons wishing private or two-party lines may have to be contented for a while with four-party service, and that some extension sets have to be withheld for a short time.

The Southern Bell had to furnish equipment and install large telephone exchanges in sixteen cantonments located in the southern territory.

Public Utility Commission News

Reports Concerning the Activities of State Regulating Bodies in the Telephone Field

Alabama

R. S. LOVETT, of the war industries board, has written a letter to the state public service commission in which the information is given that all the telephone companies of the country have decided as a war economy to cut down the installation of new telephones during the war. Only when a telephone is taken out will one be put in. In other words, anyone wishing to become a subscriber must wait until a telephone is removed before they can secure one.

California

The State Railroad Commission has amended its order of January 18 authorizing the Southwestern Home Telephone Company of Redlands to issue notes, deferred certificates and bonds. The original order provided that the company might issue and pledge $177,500 of bonds to secure the payment of $89,050 of two-year 6 per cent notes. On the payment of the notes all of the bonds were to be returned to the company's treasury. In the amended order the commission permits the company to use, after the payment of the two-year notes, bonds to secure the payment of moneys advanced to the company by the bondholders through postponing the collection of the April interest coupons. The order of the commission provides that for this purpose the company may pledge $2000 face value of bonds for each $1000 advanced by the bondholders and represented by deferred interest certificates.

A report showing the progress made in consolidating the Home and Sunset telephone systems by the Southern California Telephone Company was approved by the Board of Public Utilities.

The report states that the physical work of consolidating the exchanges of the two systems is about 76 per cent completed and says a completion of the consolidation is assured in May.

The State Railroad Commission has decided that the California Light & Telephone Company must extend its lines for telephone service in the Bellevue and Stony Point neighborhood.

Attorney Lucien E. Fulwider, who represented a number of people who desired an extension of telephone service in their homes in the county at the hearing held in the court house in Santa Rosa some time since, received a copy of the order made in the case which directs the company to make the extension and take on the service petitioned for within thirty days from the time of making the order which was on January 31.

The order was made in the matter of the application of Emily Mackey, Carter Pedrotti, Peter N. Ruaghetti, J. T. Roche, G. A. Lasher, et al.

Georgia

After hearing all the evidence offered and the conclusion of brief arguments from representatives of the company and protestors against the granting of the petition, the State Railway Commission took under advisement the matter in which the Southern Bell Telephone Company applies for authority to enforce a clause in its contract prohibiting the use of telephones by others than subscribers or agents.

General counsel for the company, Hunt Chipley, and Vice President J. Epps Brown presented the contentions of the corporation and stated that no such rigid restrictions were contemplated as would preclude the courtesy on the part of a subscriber of permitting telephone use to a guest, but that the abuse of such courtesy as prevailing in many stores and public places where indiscriminate use of telephones is permitted, is desired as a measure of protection to subscribers and a means of increasing the efficiency of the service.

T. T. Miller appeared as the representative of the city of Columbus and stated to the commission that since the officers of the company had explained their position in the matter his constituents would withdraw their objections.

R. C. Turner, acting as spokesman for citizens of Atlanta, contended that the petition was designed for no other purpose than to put more money into the company's treasury and that the system is already a distinctly paying proposition. Thomas W. Loyless, editor of the *Augusta Chronicle*, also withdrew objection after statements of the company's representatives.

J. C. Wilson contended that the petition should be denied, while two members of a former electrical committee of the city council expressed the belief that the contentions of the company are reasonable and would result in more efficient service if carried out according to the terms suggested by the representatives of the company.

Mention was made of the desire of telephone officials to relieve the operators of the unnecessary burden entailed in the obligation to answer time calls, and the assertion was made that a daily average of 12,000 daily requests for the time are received in the exchanges and that the total average daily calls aggregates 280,000.

It is expected that the commission will reserve its decision until the next regular meeting, which will be held on March 12. No executive session has been called for discussion of the matter, and, in the opinion of the chairman of the board, the decision will be reserved until that date.

Illinois

Telephone rates in Girard and in the rural communities adjacent are to be increased, if the State Utilities Commission gives its approval to a new schedule filed by the Mutual Telephone Company. The petition has been recorded, and states that additional cost of operation necessitates an increase in rates.

C. B. Cheadle of Joliet, secretary of the Dixon Home Telephone Company, the Abingdon Home Telephone Company, the Niantic Telephone Company, the Sparland Telephone Company, the Menard Telephone Company, the People's Telephone Company of Chillicothe, the National Telephone & Electric Company and the Macon Telephone Company, appeared before Hugh Dillon, private secretary to Chairman Thomas C. Dempcy of the State Public Utilities Commission, to answer a citation issued by the commission commanding him to appear and

show cause why he had not obeyed the orders of the commission by making the reports required by law in regard to the sale of securities. Mr. Cheadle told Mr. Dillon that he had neglected to do so because he had been so busy, and promised to obey the orders of the commission in regard to the reports in the future.

The commission issued an order dismissing the complaint of the Litchfield Telephone Company of the stringing of wires on Edwards street, Litchfield, by the Southern Illinois Light and Power Company of St. Louis, which touched the wires of the telephone company. The Southern Illinois Light and Power Company has promised to place the wires on the opposite side of the street.

The commission issued an order suspending until June 20, 1918, the proposed increase of rates of the Gillespie Telephone Company in Gillespie, Macoupin county, pending investigation into the reasonableness of the new schedule.

The commission issued an order resuspending to March 28, 1918, the proposed advance in rates for long distance and local telephone service of the Christian county Telephone Company.

Indiana

Evidence affecting the petition of the Greencastle Telephone Company for an increase in its service rates was heard by Paul P. Haynes, a member of the Indiana Public Service Commission.

Despite the fact that the question of rates affects most families of the city, little interest was shown by the patrons of the company. Only the attorneys, Mayor Bartley and members of the city council, Mr. Weik and Mr. Gilmore, owners of the telephone plant, witnesses and a few others attended the hearing.

J. K. Johnson, of Indianapolis, a telephone engineer and appraiser, who prepared the petition of the company, upheld the contention of the company that an increase in rates is essential to the continued operation, extension and improvement of the plant.

The members of the state utility commission at Monroeville heard the Home Telephone Company request for a raise in its telephone rates. If the raise in rates is allowed the business places will pay $2.00 per month and all residence telephones, town and country, will pay $1.00 per month.

Massachusetts

Conditions growing out of the conduct of the war have caused the Massachusetts Public Service Commission to drop its request for a special appropriation for a thorough investigation of telephone rates and services within the state.

The commission's position with reference to the telephone situation is set forth in its annual report. In its reports for the three preceding years a request has been made that $25,000 be appropriated for an investigation. A bill providing the money passed the House last year, but was defeated in the Senate. The general appropriation for the telephone department was increased at that time, however, from $6,000 to $10,000, the additional amount to be used for whatever purposes the commission might see fit. The report says:

The question now arises whether the appropriation which has thrice been refused should again be sought, so that the commission may be in a position to undertake a general and thorough investigation of the rate situation. Such an investigation must eventually be made, if the commission is to perform the duty to the people of Massachusetts which the law contemplates it shall perform.

Under normal conditions the commission would, without hesitation, renew its recommendation. Conditions, however, are distinctly abnormal. At the time when the matter was under consideration by the Legislature last year the commission was asked whether the outbreak of the war was a sufficient reason for postponing the investigation recommended and an opinion to the contrary was expressed. Conditions which have since arisen, however, tend to alter this view. Prevailing high prices of materials and the increases in wages which have been or probably will be granted make the present outlook for any reduction in rates as a result of an investigation very doubtful.

Nearly all the companies under the supervision of the commission are seeking increases in rates. Moreover, the depletion of clerical forces of the company by enlistment and the draft which has taken place, and the still further depletion which is likely to occur, make it a bad time to impose extra labor upon the statistical, accounting and engineering departments.

Upon consideration, therefore, it has seemed best to the commission to defer for the present its request for a special appropriation for investigation purposes. There is much, however, which can and should be done, even under prevailing conditions, to lay the foundation for such an investigation. Information in regard to the corporate and financial histories and intercorporate relations of the numerous corporations involved can be secured, and the results of previous investigations, both in this State and elsewhere, can be studied and prepared for future use.

No special appropriation for this purpose is desired, but it will be necessary, if the work is to be carried on, that the full appropriation for expert services asked for the commission's budget shall be granted. The amount specified is but $8,000, a very meagre sum. The work of the commission in the past two years has been distinctly handicapped by the reduction in the size of this appropriation, and the full amount ought to be allowed in order that sufficient funds may be available, not only for research work in the telephone department, but also for emergency uses in other departments of the comission's work.

The report says that during the past year 725 informal complaints against telephone service have been investigated, as against 603 in 1916 and 412 in 1915. An additional inspector has been employed to take exchange tests and observations for the purpose of determining the character of the service as a whole. Tests of this character in the Dorchester exchange last year brought good results, the commission says.

Michigan

The state railroad commission on February 16 ordered the Michigan State Telephone Company to adopt measured service in Detroit, beginning August 1, despite the strenuous opposition of city officials.

The commission did, however, reduce the company's valuation claim of $13,000,000 to $11,000,000; the city claimed the basis on which the deficit should be figured was $8,000,000.

"The service rendered Detroit telephone users is admittedly bad," says the opinion, "but there will be 'interim rates' which will increase the cost of each business telephone $12 a year, one-party residence rates, $6 a year, and limit four-party residence lines to 60 out-going calls monthly; the excess calls will cost four cents each."

The opinion on metered rates follows in part:

"It would, in fact, be difficult to mention a commodity or a service required by the comfort, necessity or convenience of the public which is not, at this time, sold on a metered basis.

"It is the opinion of the commission that the metered service schedule proposed by the Michigan State Telephone Company, subject to certain modifications, should be approved and made effective; that its application be made by exchanges or otherwise, in the most expeditious

and economical manner; that it should supersede all existing rates for the classes of service covered by it.

"The record discloses a number of long-term contracts. These contracts were assumed by the Michigan State Telephone Company at the time of its purchase of the Home Telephone Company property and are discriminatory under any system of rates. The rates fixed by these contracts should be superseded by the rates hereby fixed.

"It has been urged that the telephone company should be required to so improve its facilities as to give service of a proper standard to its subscribers in Detroit, as a condition precedent to the allowance of any increase in rates.

"The citizens of Detroit do not expect to receive telephone service for less than it costs to give it, and are not unwilling to pay such rates as will fairly compensate the company for its services.

"While rates are necessarily based on present conditions and past experience, it must be kept in mind that they are to be applied to the business and operations of the future, and they should be such as will apply, with fairness, to such conditions as the future will probably develop. It remains for the Michigan State Telephone Company to provide a quality of telephone service in the city of Detroit equal to that of any other city, and as good as the most modern engineering and inventions can supply."

In addition to the rates for homes and stores the commission added these:

Private exchanges are to have minimum equipment and service.

Non-multiple, one-position switchboard with operator's set; two trunk lines; two telephone stations located on same premises as switchboard, including 5,000 outgoing local messages per year.

Minimum rate per month, $16.50; additional positions of switchboard with operator's set, each, $2; additional stations, each, 50 cents; additional trunk lines, each, $2; additional local messages, each, 2 cents.

Multiple switchboard will be furnished when desired at an additional charge of $10 per annum for each strip of 20-multiple terminal jacks. For each 6,000 calls per annum contracted for in excess of the first 6,000, the multiple jack rental will be reduced $10 per annum.

Receiving station and switching device three additional stations and two trunk lines, including 6,000 messages per annum, $18 per month; additional stations, each 50 cents; additional trunks, each, $2; additional messages, each, 2 cents.

Maximum equipment: Eight stations, two trunks 30 feet of cable per station, four stations, one trunk.

Ten per cent discount is allowed if bill is paid at the telephone company's office on or before the 10th of the month in which the service is rendered.

For public pay stations the company will allow compensation for space and will install them, with guarantee, in store pay station service will be furnished under the guarantee coin box service.

The company is to furnish all its subscribers in the Detroit exchange, at the time bills are rendered, the schedules approved by the commission, statements of rates for classes of services furnished, and with such explanation as may be necessary for understanding the changes.

The company shall also make and file the commission sworn statements giving a detailed statement showing the installation of additional facilities operating to increase the capacity of the plant within the Detroit area and the cost, since December 31, 1915.

This statement is to be filed at the end of the first calendar month next after the expiration of 60 days after the date of this order, and each calendar month thereafter.

The new Detroit rates, beginning this month, work out as follows:

Single party lines (unlimited), $4.44 per month.

Two party lines (unlimited), $3.33 per month.

(Ten per cent discount is allowed if bill is paid on or before the tenth of the month in which the service is rendered).

Four party line, 60 outgoing messages, per month, $2. Excess messages, four cents each.

Extension rates will be.

Residence (unlimited service), 83 cents per month.

(Ten per cent discount is allowed if bill is paid on or before the tenth of the month in which the service is rendered).

Residence (four-party service), 75 cents per month.

Business, 50 cents per month.

The interim rates for business phones are as follows, effective March 18:

For one-party business line, unlimited service, $84 per annum; the present rate is $72 per year.

For two-party business telephone, unlimited service, $72 per annum. The present rate is $60 per year.

The rates for business phones when the metered service goes into effect will be:

No. local messages one year.	*Annual rate.*	*Rate of excess messages.*
800	$48	4c each
1,000	54	4c each
1,200	60	4c each
1,400	66	3c each
1,600	72	3c each
1,800	78	3c each
2,000	84	3c each
2,200	90	3c each
2,400	96	.....

Local messages in excess of 2,400 up to 3,600 contracted for in advance in lots of 200, two and one-half cents each. Not contracted for, three cents each.

Local messages in excess of 3,600 contracted for in advance in lots of 200, two cents each. Not contracted for, two and one-half cents each.

Auxiliary lines with stations, $30 year each.

The schedule provides for a refund to be made at the end of each year, should fewer messages than these paid for be sent, so that the sum retained by the company shall be the rate for the number of local messages sent as fixed in the schedule, but in no case less than the minimum schedule rate.

Coin box service is:

Five cents per call.

One-party line, 16½-cent guarantee per day.

Four-party line, 10-cent guarantee per day.

A commission of 50 per cent is paid on receipts for local messages in excess of guarantee.

The Valley Home Telephone Company at Bay City wants an increase in rates. In its petition filed with the Michigan railroad commission, it uses the words "alter rates." The increase sought is set forth as follows: Individual business telephones from $30 to $42 a year; party business telephone, $26 to $34; individual residence, $20 to $24, and selective residence at $18 to $20 a year.

Minnesota

In the matter of complaint of the Red Lake Eastern Marshall Farmers Telephone Company against the Eastern Development Telephone Company for discrimination in telephone rates within the village of Goodridge, Pennington county, Minnesota, hearing was held by J. W. Howatt, telephone supervisor.

The Red Lake Eastern Marshall Farmers Telephone Company has filed with the commission its schedule of rates, which are as follows:

Business telephones, one-party line, per month.....$2.00
Residence telephones, one-party line, per month..... 1.25

The Eastern Development Telephone Company is organized under the mutual co-operative plan, each member owning one share of stock and paying $30.00 for the same. The company also has subscribers who are not shareholders and the regular rates charged are as follows:

Individual line business, where the company owns the telephone and the subscriber is not a shareholder, per month $1.50
Business and Residence telephones on the same line, where the subscriber owns and maintains the telephone and is not a shareholder, per month.....$1.25
Individual line business, where the subscriber owns his own telephone and is not a shareholder of the company, per month.....$ .75

Individual line business, where the subscriber is a shareholder in the company and owns his own telephone, per month .....$ .25
Individual line residence, where the subscriber is a shareholder and owns his own telephone, per month.....$ .25

It is ordered that the Eastern Development Telephone Company discontinue the free service furnished to the depot of the Northwestern Electric Railway Company at its office in the village of Goodridge; that it discontinue its preferential rates to shareholders of the company and to subscribers who own their own telephone instruments; that it put in force for all business telephones its business rate filed with the commission as follows:

Individual line business, where the company owns the telephone and the subscriber is not a shareholder.....$1.50 per month

The respondent shall file with the commission additional schedule of rates for residence telephone service and for such other service as it is furnishing, said rates to conform with the rates of the Red Lake Eastern Marshall Farmers Telephone Company.

The Deer Creek Telephone Company has filed an application with the commission for authority to increase its rates for business, residence and rural telephone service within the village of Deer Creek, Ottertail County, the proposed rates being as follows:

Individual Line Business.....	$2.00	per	month
Individual Line Residence.....	1.75	"	"
Party Line Residence.....	1.50	"	"
Extension Telephones	1.00	"	"
Multi-party Rural	1.50	"	"

payable quarterly in advance by the middle of the second month in each quarter. If paid by this time, a discount of 25 cents per month will be allowed.

Installation fee $5.00

to be applied on regular rental rate after six months of service.

Station moves and changes.....$1.00

It is ordered that the matter be heard at the Village Hall in Deer Creek at 1:00 P. M., on March 5.

The Vergas Telephone Company has filed an application with the commission for authority to increase its rates for business, residence and rural telephone service, within the village of Vergas, Ottertail county, the proposed rates being as follows:

Individual Line Business.....	$2.50	per	month
Individual Line Residence.....	1.50	"	"
Two-party Line Residence.....	1.25	"	"
Four-party Line Residence.....	1.25	"	"
Rural Multi-party	1.25	"	"

A discount of 50 cents will be allowed if paid six months in advance, and a discount of $1.00 will be allowed if paid twelve months in advance.

It is ordered that the matter be heard at the Village Hall in Vergas at 10:00 a. m., on March 6.

Montana

The Public Service Commission of Montana has granted the application of the Mountain States Telephone & Telegraph Company for an increase of 50 cents per month in the rate for telephone service in business places in Roundup. J. H. Hall, one of the members of the commission, does not concur in the order. The grant reads:

It is ordered that the petition of the Mountain States Telephone and Telegraph Company, to classify Roundup, Montana as a Class 'C' exchange, and to notify its rates, rules, and regulations to conform to said classification, be approved.

It is further ordered that the Mountain States Telephone and Telegraph Company, shall, not later than twenty days from the date or receipt of this order, file with the secretary of the Public Service Commission, an amended schedule of rates, rules and regulations, classifying the telephone exchange at Roundup, Montana, as a Class "C" exchange, and that same shall be in full force and effect on and after March 1, 1918.

Nebraska

The Lincoln Telephone & Telegraph Company has applied to the state railway commission for leave to issue $500,000 of common stock to provide funds for telephone facilities required by the public in the territory in which it operates. The company asserts that it is necessary to constantly extend and enlarge its plant and lines. It has filed with the commission a monthly statement showing the financial condition of the corporation. The company's directors authorized the issuance of the proposed stock at a meeting December 1, 1917, subject to the approval of the commission. The commission authorized an issue of 25,000 shares in 1912. Of that amount 17,499 shares were issued and sold and the proceeds used as authorized.

New Hampshire

The New Hampshire Public Service Commission has announced that the proposed rates of the Coos Telephone Company will not be allowed to go into effect until after a full hearing and investigation. This statement follows a meeting of protest held at Whitefield, at which practically every town in the district raised its voice in opposition. At the same time the corporation filed with the Public Service Commission a new schedule of toll rates, which is notable for increases in charges in many instances. For instance, the proposed change would raise the toll rate to Littleton, Bethlehem, Gorham or Berlin from Lancaster from 15 cents to 20 cents.

Ohio

Twelve investigators representing the Ohio Public Utilities Commission have been studying the efficiency and adequacy of the service of the Cleveland Telephone Company in Cleveland.

The probe is being made in connection with the company's application for increased rates, which is being opposed by city officials. Thomas Green of Columbus, in charge of the telephone department of the state commission, is directing it.

The probers have been timing calls, inspecting equipment at exchanges and taking the testimony of men familiar with conditions about the plant.

Announcement was made at Columbus that the commission would insist upon service being improved commensurate with whatever rate increase might be allowed.

Attorney Shirley H. Tolles, representing the telephone company, introduced testimony before the commission about additions and improvements made to company property since April 1, 1914, the date of the last value fixed on the assets by the commission.

Tolles contended that even the higher rates asked would yield a return of but 4 per cent on the investment.

The hearing was recessed to March 6.

The commission fixed the valuation of the Cleveland Telephone Company's property at $12,580,924.09.

That is $622,000 less than that at which the company itself appraised the property. The commission said that much of the property was not yet in use.

The commission fixed $1,128,776.20 as the amount of the depreciation on the company's property.

The Ohio State Telephone Company in its effort to increase the net rates of business telephones in Columbus from $40 to $51 a year, has filed an application with the state public utilities commission, asking for an order approving the schedule for the proposed increase, which was filed with the commission January 1, 1917. The company, in its application, says there were no objections or complaints to the new rates and that they became effective February 1, 1917.

The proposed increase is being opposed by the city of Columbus in the courts, and City Attorney H. L. Scarlett said that he would oppose any hearing of the application by the commission on the ground that it is without jurisdiction to consider the question because the rates the company is authorized to charge are stipulated in its franchise, and, therefore, are not subject to review by the commission.

"In the fight in the courts against the proposed increase in rates, the city has won out so far, and I shall certainly oppose this move to take the controversy to the utilities commission," said Attorney Scarlett.

Because of other tasks, the appraisers of the state public utilities commission will not be ready for another month to begin the valuing of the property of the Central Union Company, in Columbus, which work has been ordered by the commission, to determine if the company should be allowed to increase its monthly residence telephone rates from $1.50 to $2 a month.

The company is required to file an inventory of its effects with the commission as early as possible. If the city and the company can agree upon a plan by which the appraisers may make the valuation by short cut methods this will be accepted by the commission.

Ohio State Telephone Company officials have in contemplation a request to the state public utilities commission to grant an increase in telephone rates.

It was said that one of the reasons was an increase of from 40 to 50 per cent in operators' wages and a claim that material had advanced in some instances over 100 per cent.

The Ohio State Telephone directory shows about 9500 subscribers to the Canton exchange.

It will be some time before the commission will be able to investigate the complaint of the city of Canton regarding telephone service there, according to a reply received by Mayor Poorman from the state commission to the request he made for a probe of the service rendered patrons of the telephone companies.

The commission, in its letter, said it was almost swamped with complaints of poor service, many of which are probably due to the unusual weather conditions and that the Canton case would have to wait its turn.

Users of the M. W. & O. who live on Madison Hill, and in Bloomington, believe that in a short time their former telephone status will be restored, and that they will pay rates on the same basis as do people of Wooster city.

When the company rates were revised some months ago, patrons in Bloomington and on Madison Hill were given a rate that was higher than that given the citizens of Wooster.

Citizens decided to protest, and they carried the matter to the utilities commission, asserting that they should have just the same rates as Wooster people received.

The commission's telephone expert has recommended to the commission that the request of the petitioners be granted.

"I understand the commission's expert has made this recommendation," stated M. M. Herron, the company's manager. "So far as we know, however, the commission itself has taken no action, although I am of the opinion that the action will sustain the expert's recommendation."

The Mt. Vernon Telephone Company and the Bell Telephone Company of that city filed with the public utilities commission joint application for permission of the latter to sell its property to the Independent company.

Oregon

For some time the Public Service Commission of Oregon has had pending before it an investigation undertaken on its own motion, of every rate, toll, charge, rule, regulation and practice maintained in the management and operation of the telephone system of the Pacific Telephone & Telegraph Company within the state, and has from time to time issued findings and orders therein pertaining to the value of property involved in the service of the public and to certain of the above matters.

On January 1, 1918, the Pacific Telephone & Telegraph Company made effective, and designated as Tariff P. S. C. Or. No. 103, a revised schedule of long distance toll charges for such business within the state of Oregon, which schedule was based upon the plan of consistent air line mileage measurements between stations, and which elimiated the causes of frequent complaints against unequal charges for equal distances and equal charges for unequal distances.

Although the commission believes that there is no more scientific method of assessing toll rates for long distance conservations, it is now apparent that, in accomplishing the idea of consistent charges on the direct air line mileage basis, increases were made in rates for service between certain stations and decreases were made between certain other stations, and that the net result figured upon normal traffic conditions is an increase in the toil operating revenue of the company due to the existence of increases on a large number of heavy traffic routes not completely offset by similar decreases.

The commission, after fully considering the effect of these rates, and in view of the proceedings pending before it, is of the opinion that the increase resulting from the new schedule is of such extent as to require complete investigation before the rates shall be allowed to continue in effect.

It is therefore ordered that on and after February 1, 1918, the rates and charges in said Tariff P. S. C. Or. No. 103 of the said Pacific Telephone & Telegraph Company be altered and amended so as to conform to the rates and charges maintained by the Company prior to January 1, 1918, until such time as the Commission may complete an investigation and decision in regard to the reasonableness thereof.

It is also ordered that Tariff No. 3 of the Northwestern Long Distance Telephone Company be suspended until such time as the commission may complete its investigation and render a decision in regard to the reasonableness of the rates and charges made for long distance telephone conversations by the Pacific Telephone & Telegraph Company in the State of Oregon.

The Canyonville and Riddle Telephone Companies have been permitted to increase their rates.

Pennsylvania

Arguments of the attorneys and the filing of briefs in the Petroleum Telephone Company rate case took place before the Public Service Commission in Harrisburg on Wednesday, Feb. 15. Four of the commissioners were present at the hearing. It is expected that the decision will not be rendered for the next two months.

The Petroleum Telephone Company was represented by W. S. Paca, general manager, and Hon. P. M. Speer, its attorney. The city was represented by the city solicitor, E. C. Breene.

Virginia

The Chesapeake and Potomac Telephone Company of Virginia will, at an early date, file application with the

State Corporation Commission for permission to increase all intrastate rates.

Fred C. Bonney, local manager of the company, stated that data to support this intended request is being prepared. Mr. Bonney said that he is not now in a position to state definitely what increase would be asked for, as this depended upon investigation now in progress.

It was also stated by Mr. Bonney that the Chesapeake and Potomac Telephone Company, which operates in Virginia, Maryland and the District of Columbia, could not fill any orders for residence telephones. The company has been unable to place any residence telephones for several months.

Judge Garnett stated that the gross receipts of the Chesapeake and Potomac Company, for the year ended June 30th, 1917, was $2,214,303, and that to determine the propriety of granting any request for an increase in rates could only be passed upon after a most thorough investigation of the case.

Wisconsin

The State Railway Commission is beginning its hearings on the petitions of the public service corporations of the state for increases in rates. A large majority of the farmer telephone companies of the state are asking higher rates claiming that service cannot be given at the present rates. The cost of maintenance has, it is said, increased materially.

The officers of the Hubertus Telephone Company were called to Madison to present their claim regarding the right to raise their rates to telephone users. The hearing was held before the Railroad Commissioner. The officers of the telephone company state that the high cost of material together with many other expenses connected with the business makes it necessary for them to raise their rates.

Wyoming

The Mountain States Telephone & Telegraph Company has appealed to the state public utilities commission for an increase of telephone rates in Casper. The company requests that an increase of $1 on individual business lines and an increase of 50 cents on party lines be allowed by the commission. This would bring the rate up to $5 a month for individual business lines and to $4 a month to party business lines.

Mr. Brown, division general superintendent, and Mr. Titus, district manager for the telephone company, laid the request before Acting Governor Frank L. Houx, the only member of the public utilities commission present. The representatives of the telephone company submitted a petition of almost 70 per cent of Casper's business telephone subscribers who agree to the proposed increase in rates.

The state public utilities commission will hold a meeting in Douglas Thursday to hear the application of the Douglas Light company for an increase in rates.

Summary of Class A Telephone Companies

Interstate Commerce Commission Bureau of Statistics Report for November, 1917

Compilations, subject to revision, from 61 reports of revenues and expenses of telephone companies for the month of November, 1917, filed in the Bureau of Statistics. This summary includes only companies having annual operating revenues in excess of $250,000.

SUMMARY OF MONTHLY REPORTS OF LARGE TELEPHONE COMPANIES.

Item	*For the month of November* 1917	1916	*Increase (or decrease)* Amount	Ratio (%)	*For the eleven months ending with November* 1917	1916	*Increase (or decrease)* Amount	Ratio (%)
Number of company stations in service at end of month	7,674,389	7,070,613	603,776	8.5	.....	.....	.....	....
REVENUES:								
Subscribers' station revenues	$17,446,326	$16,115,020	$1,331,306	8.3	$187,972,224	$169,108,108	$18,864,116	11.2
Public pay station revenues	1,433,030	1,269,944	163,086	12.8	15,164,494	13,361,152	1,803,342	13.5
Miscellaneous exchange service rev.	272,359	254,348	18,011	7.1	2,937,640	2,594,721	342,919	13.2
Message tolls	6,914,275	6,398,714	515,561	8.1	74,671,792	63,771,968	10,899,824	17.1
Miscellaneous toll line revenues	667,668	596,222	71,446	12.0	6,946,335	5,823,828	1,122,507	19.3
Sundry miscellaneous revenues	290,450	257,366	33,084	12.8	3,036,800	2,783,698	253,102	9.1
Licensee revenue—Cr	1,025,766	939,105	86,661	9.2	10,963,677	9,700,012	1,263,665	13.0
Licensee revenue—Dr	1,023,244	924,287	98,957	10.7	10,934,636	9,535,980	1,398,656	14.7
Telephone operating revenues	$27,026,630	$24,906,432	$2,120,198	8.5	$290,758,326	$257,607,507	$33,150,819	12.9
EXPENSES:								
Depreciation of plant and equipment	$ 4,560,747	$ 4,510,418	$ 50,329	1.1	$ 51,622,595	$ 46,997,188	$ 4,625,407	9.8
All other maintenance	3,915,317	3,285,817	629,500	19.2	40,891,420	34,421,355	6,470,065	18.8
Traffic expenses	6,550,715	4,984,785	1,565,930	31.4	64,969,253	51,281,831	13,687,422	26.7
Commercial expenses	2,568,971	2,371,521	197,450	8.3	27,901,203	24,928,598	2,972,605	11.9
General and miscellaneous expenses	1,334,198	1,114,399	219,799	19.7	13,871,688	11,487,052	2,384,636	20.8
Telephone operating expenses	$18,929,948	$16,266,940	$2,663,008	16.4	$199,256,159	$169,116,024	$30,140,135	17.8
Net telephone operating revenues	$ 8,096,682	$ 8,639,492	*$ 542,810	*6.3	$ 91,502,167	$ 88,491,483	$ 3,010,684	3.4
Other operating revenues	$ 1,253	$ 1,226	$ 27	2.2	$ 14,097	$ 13,336	$ 761	5.7
Other operating expenses	1,806	1,227	579	47.2	14,597	14,038	559	4.0
Uncollectible operating revenues	108,040	133,319	*25,279	*19.0	1,380,579	1,518,748	*138,169	*9.1
Taxes assignable to operations	2,014,849	1,490,451	524,398	35.2	19,298,411	14,294,789	5,003,622	35.0
Operating income	$ 5,973,240	$ 7,015,721	$1,042,481	*14.9	$ 70,822,677	$ 72,677,244	*$ 1,854,567	*2.6

*Decrease.

Of Interest to the Trade

What the Telephone and Accessory Manufacturers Are Doing to Advance the Art

Tire Problem Solved for Telephone Cars

Every day sees a new step in automobile construction and equipment, all making for a better machine, better service, more complete satisfaction. Engineers have reduced motor car building to an exact science and have ever in view economy and convenience of operation.

Only one great bug-bear of motor car use had remained unsolved and that was the question of tire service and tire costs. As long as the car had to be exposed to the dangers arising from weakness of inner tubes just so long was car use handicapped by the dangers of accidents and the annoyance of tire changing and tire repairing under distressing circumstances.

Today even this last barrier to the efficiency of the motor car has been removed, for Essenkay tire filler successfully and satisfactorily replaces air in tires and removes all danger from the puncturing of tires and inner tubes, from blow-outs, rimcuts, etc.

Essenkay is not only a perfect substitute for air but it saves and protects the tires, adds immeasureably to their long life, and has the resilience and comfort-giving qualities of air-filled tires without their danger and annoyances.

In appearance Essenkay is a brown substance that looks like rubber yet has none of rubber's faults. It is resilient as rubber, and is impervious to heat or cold. It has absolutely no rubber in it, nor glycerine, glue, gelatine, or other substances that might be influenced by changes of temperature. It is impervious to water. Heat will not cause it to expand, nor will cold cause it to contract. It is not sticky, gummy or detrimental to tires. When the tire, filled with Essenkay, is worn to the fabric you can remove the filler and use it again in another set of casings. It will outwear a dozen tires.

Essenkay is easily installed in any tire and it has doubled the efficiency of passenger cars and light commercial vehicles.

If you ride in an Essenkay protected car you will find that it rides as smoothly and joltlessly as if the tires were air-filled. It absorbs shocks in a way that eliminates rebound therefore increasing the life of the car and springs.

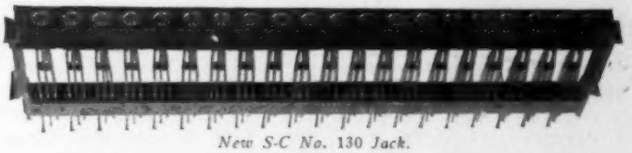
Essenkay has been proved practical by over 16,000 motorists. Thousands of spectators viewed the interesting exhibition of Essenkay Tire Filler at the National Automobile Shows in New York, Chicago and Cleveland. At each of these shows sections of the tire filler remained immersed in boiling water continuously from the opening day of the show until the doors closed. Another section of Essenkay remained frozen in a solid cake of ice for the same period of time, while another section was confined for a week in a glass tube under great pressure (approximately 2,000 pounds per square inch) between the jaws of a heavy vise. At the close of each of these shows it was found that the material was not affected in any way by heat, ice, water or excessive pressure.

The success of Essenkay Tire Filler as a substitute for air in tires is a remarkable one. This is especially true of its use in the many converted trucks now in such general use. The owners of the converted trucks had a serious problem. Air-filled tires were so subject to punctures and blow-outs that this trouble caused endless delays and entailed a heavy expense. Solid tires could not be used, especially on front wheels, since they cause a jarring that brings on engine troubles. Equipped with Essenkay Tire Filler, these light trucks made with automobile power plants and chassis are now delivering 100 per cent service. Delays are avoided because punctures and blowouts are impossible and a great economy in tire costs has been effected.

New S-C No. 130 Jack

The accompanying illustration shows the general design of the Stromberg-Carlson Telephone Manufacturing Company's new No. 130 Type jack which will be furnished in the company's central energy switchboards henceforth.

The new jack is of skeleton construction with the various elements disposed to give maximum strength combined with light weight and accessability. Each jack is individually braced and is provided with a heavy terminal extending straight back from the center line of the thimble and anchored solidly in the back clamping strip of the jack mounting. These bars of metal tie the front and back members of the mounting strip so that the strains are evenly distributed—not concentrated on the end pieces of the frame. Increased strength over previous types is also gained by making



New S-C No. 130 Jack.

the front rubber strip 9/16 inches deep instead of ½-inch deep, as in previous types.

Another important new feature is the design of the jack springs, the plug contact surfaces of which are made concave to fit around the plug instead of bearing upon the plug at a straight point as in other kinds of jacks. Besides giving a better contact with the plug the new shape spring gives increased tension and reduces the possibility of taking down connections by mistake.

Special consideration has also been given to the insulating features of the jack. All separators and bushings between the springs and between the springs and the frame are made of D. M. F. material which has a higher resistance per unit of thickness than hard rubber and which will not char or soften when subjected to heat from soldering irons, etc.

Jacks of this type are furnished with various contact spring arrangements for use with the line and trunk circuits in common use.

The Stromberg-Carlson Telephone Manufacturing Campany announces, under date of February 18, an increase in the prices of magneto telephones. The new price sheet may be obtained from any of the company's branch houses.

Kellogg Booklet "Things to Remember"

These paragraphs might appear in the "For girls only" column, as they are of special interest to the operator.

The Kellogg Switchboard & Supply Company has just issued a booklet entitled "Things to Remember" for distribution among telephone operators.

These little booklets should be in the possession of every one whose work is at the switchboard, as they contain valuable information on looks—not facial appearance, but vocal—how you should look to the subscriber.

"Things to Remember" is truly an appropriate title, as the contents indeed contain things to remember. Among the things mentioned are: Answering signals, recording, operator's phrases, testing circuits, signaling, receiving tickets, passing a "Sent Paid," "Sent Collect," appointment or a messenger ticket and acknowledging tickets. Code symbols and their interpretations, the right and wrong ways to handle cords, which are illustrated, and supervising messages are also included.

All of these subjects are invaluable, to the toll operator especially. They are neatly printed on antique stock and are of a size that will fit very comfortably in the hand bag or vanity case and can edge in with the powder puff, rouge jar, or whatever the camouflage may be.

These booklets were made up of extracts from an edition written by Miss Kitty Gang. The Kellogg reprint was edited by W. S. Vivian and is being sent out with the compliments of the Kellogg Switchboard & Supply Company, upon request.

Automatic's "Win the War" Banquet

The nineteenth floor of the Hotel La Salle, familiar to telephone men all over the country through having attended national conventions there, was the scene Saturday evening, February 2, of the 26th anniversary get-together banquet and dance—this year called the "Win the War" banquet—of Automatic Electric Company's employes.

The spirit pervading the whole affair—the serious purpose underneath the festivities—is summed up in the following words which appeared on the back of the program:

"A great alliance of nations is fighting today to 'Make the world free for democracy.'

"But this conflict, unlike all previous wars, is not simply a battle of armies—it is a struggle of peoples, and that side will win whose people fight best and hardest.

"Behind America's army and navy must stand America's factories and farms. Our boys who have left for the front can never win victory unless our factory stands back of them and supports their valor with the most efficient production of which we are capable.

"The efficiency of Automatic Electric Company depends upon the earnest, honest and intelligent co-operation of every man and woman in it—official and workman, deskman and salesman.

"Co-operation such as this will make our factory a 'Win the War' factory."

Toastmaster H. D. Critchfield, after a few opening remarks in which he pointed out the fact that 107 men have left the company's employ for military service, presented President Joseph Harris, who spoke briefly and invited all present to attend the company's "Victory Banquet" next year.

R. G. Fisher, president of the Soldiers' and Sailors' Service Association of Automatic Electric Company, announced that the membership had reached 1,050 after only two days' canvassing of the factory, and Owen Fox, of the Chicago 4-Minute Men, explained the thrift stamp campaign.

The main speaker of the evening was the Rev. Dr. R. A. White of Chicago, who addressed the national telephone convention banquet two years ago. After expressing pleasure to be with the makers of the automatic telephone system which he has used in all parts of the world, Dr. White delivered a most powerful arraignment of the German government, pointed out why, from every consideration of honor and international obligation, the United States could not continue as a neutral, and he voiced a compelling demand upon every man and woman present to give the utmost loyalty in thought, word and deed, to this country during this greatest of all wars.

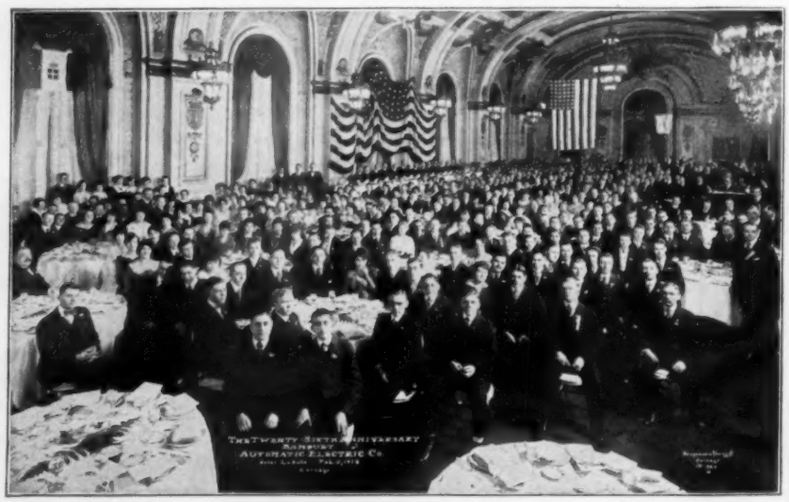
Patriotic songs and orchestral music were rendered between courses and before and after the various speakers.

Posters to assist Higher Rates

As a result of the illustrated article "Suggestions for Your Show Window" in a recent issue of TELEPHONE ENGINEER, the Kellogg Switchboard & Supply Company, has received numerous requests for illustrated placards showing reasons why telephone companies are entitled to higher rates, which they could hang in their exchange windows.

The Kellogg Company, ever willing to aid the Independent telephone man, has gone to considerable expense in making up a series of illustrated sheets, poster size, printed on durable paper, portraying the comparison of material cost to the time when the present rates were established.

These sheets do not contain advertising matter of the Kellogg Company, and are sent out gratis. They



Automatic Employes' Win-the-War Banquet.

contain a blank space at the bottom for the telephone company to insert its name.

A set consists of a series of six pictures, every one of which tells in a forceful way why it is no more than fair that the telephone company should receive higher rates.

These posters can be had from the Kellogg Switchboard & Supply Company free of charge upon request.

New Kellogg Booklets

The Kellogg Switchboard & Supply Company has just received, ready for mailing, four illustrated booklets describing Kellogg common battery telephones, magneto telephones, combined drops and jacks, and keys.

Each one of the booklets treats of one of the subjects mentioned. The magneto and common battery telephone leaflets give the code numbers of the standard telephones and telephone combinations, which will prove of great benefit as many inquiries call for literature on standard telephones.

New Kellogg Literature.

The combined drop and jack booklet illustrates front and rear views and also a side view of the Kellogg "burn-out-proof" combined drop and jack. The special night alarm contact used on all Kellogg drops and jacks is also illustrated. The folder on keys describes the important points of both the cam and push-button types.

The booklets are neatly printed on an enameled stock and are the result of continual inquiries for information on this apparatus. The Kellogg Switchboard & Supply Company will gladly send copies of these booklets to interested telephone companies.

Kelly Field Needs Telephones

Because of the total inadequacy of the telephone system at Kelly Feld, San Antonio, Texas, a plan has been drawn up for a plant costing approximately $50,000 and supplying the field with the telephones necessary to transact its business. These plans are before the chief signal officer in Washington, and strenuous application is being made from Kelly Field for their approval and authorization.

Though telephone difficulties have existed at Kelly Field ever since the expansion of the post was started early in the summer they reached a climax recently with 589 calls unanswerable in one day. As a result, Col. W. D. Chitty, commandant, has laid the problem before the chief signal officer in Washington with earnest recommendations for improvements.

The difficulty has grown out of the fact that Kelly Field has been in a constant state of growth. Starting with a telephone system adequate for a command of approximately 3,000 men, the rapid development of the field has resulted in switchboard after switchboard being added to the exchange and the difficulties of successful connection and communication being raised to the highest degree.

There are now six separate switchboards on the field. In trying to communicate from one part of the field to another several connections have to be made. The difficulties in telephoning to and from the city are still greater. The call has to come through the central switchboard, and in some instances has to be sent through one or perhaps more boards. By the time connection is made at the far end, some one on a wayside switchboard will cut in and the whole connection has to be made over again.

The plan now before the chief signal officer in Washington provides for a central switchboard large enough to accommodate all parts of the field. All calls will then come through this center and be given direct from there to all parts of the field without other connections having to be set up. It also provides for more lines into the city, the number now in operation being totally inadequate.

Council Meets by Wire

Conducting a council meeting by telephone is the latest innovation introduced into city government, and it was successfully worked recently by Mayor John Berwald of Davenport, Iowa. As to its legality, the mayor expresses some doubt. "But then, no one is going to care one way or the other," said he.

When the federal fuel administration lifted the short hour ban from Davenport business houses, the mayor decided that the city hall should revert to its regular hours Monday morning.

Realizing that it was impossible for him to take this matter upon his own shoulders, he called six aldermen by telephone and asked them to say "aye." After each had complied, he told them what they had voted on, and each was satisfied.

So Saturday evening he was able to announce officially that the city council had decided to have the city hall open at 8 o'clock, as usual, on Monday morning, and close at 5 o'clock in the afternoon.

Motor Pole Setters

Planting the telephone crop for the country each year is a job that has nothing whatever to do with Mr. Hoover and his associates, but it nevertheless is one of vital importance to the nation. And now that the spans of telephone wires must be multiplied to bear the burden of official as well as private messages, companies have adopted the new way of setting the poles on which the wires are strung, one that is much quicker, less hazardous and less expensive than the old method of raising the pole by hand power, says *The Power Wagon*.

The Southern Bell Telephone Company is using the modern method successfully these days with the aid of motor trucks. The company now has a fleet of six large machines, which are equipped with a power take-off device that operates a winch on the side of the chassis. By means of the winch, a cable and block, it is possible to raise a telephone pole with a much smaller crew than when the pole is put up by hand. The pulley block is fastened to a pole already up, and the cable run through it. One end goes around the top of the new pole and the other is twisted around the drum of the winch. Four men with pike poles handle the lower end of the pole and guide it into the hole as the winch pulls the top into place.

Indianapolis Company Defers Dividend

Directors of the Indianapolis Telephone Company have decided unanimously not to declare, for the present, the dividend accrued on the preferred stock. Secretary F. V. Smith states that the action is due to war conditions, which have substantially increased taxes and operating expenses, and have made it seem prudent to apply all net earnings of the business to capital requirements until conditions shall have so changed as to warrant resumption of dividend. He adds that, as provided in the certificates, dividends on the preferred will accrue at the annual rate of 6 per cent for the months of November and December, 1917, and from January 1, 1918, at the annual rate of 7 per cent, and that such accrued dividends will not be taxable until payment is actually received by the stockholder.

Arkansas Association Patriotic

Resolutions endorsing the national administration and its method of conducting the war, and promising the co-operation of the association in the prosecution of all measures undertaken by the government for the successful termination of the war were adopted at the meeting of the Arkansas Telephone Association at the Hotel Marion, in Little Rock, February 12. A resolution recommending that every company in the state become purchasers of war savings stamps was adopted and a committee was appointed to prepare a plan to carry out the resolution. It was said that every telephone company in the state now is actively engaged in the sale of stamps. The meeting adjourned at noon February 12 after a two-day session.

Markets Frankel Connectors

The Westinghouse Electric and Manufacturing Company of East Pittsburgh, Pa., has recently secured the exclusive sales agency for the United States for Frankei solderless connectors, widely used for joining electrical wires and cables. Manufacturing facilities have been increased by the Frankel Connector Company, in order to care for the new business to be secured through the Westinghouse sales organization.

The Westinghouse Company will act also as a distributor of Frankel testing clips.

Oklahoma Men Meet

With approximately seventy-five members present, the Oklahoma Telephone Association opened its eighteenth annual convention at the Lee-Huckins hotel at Oklahoma City February 12. R. S. Goffe, of Sulphur, discussed the work of the association generally.

W. D. Humphrey of the state corporation commission addressed the convention in the afternoon.

Horace Truman, Guerry, Oklahoma, secretary of the organization, said that the purpose of the convention of the association was to improve the efficiency of the telephone service throughout the state. The members decided to contribute the money usually spent on an annual banquet to the Red Cross.

War Department Reduces Service

Secretary of War Baker has reached the conclusion that there are too many telephones in the War Department and its numerous branches in other buildings.

Practically every official and every army officer has an individual telephone. There are many instruments for general use in the corridors and other places in the various buildings.

With a view to reduce the congestion of messages, as well as the large expense involved, Secretary Baker has asked heads of bureaus to co-operate in reducing the number of telephones to the lowest limit possible for proper dispatch of official business.

It has been represented that the exceedingly heavy demand by the government departments on the local telephone service is interfering seriously with the use of the lines by merchants and residents of the District of Columbia.

Ohio State Absorbs Subsidiaries

All subsidiaries of the Ohio State Telephone Company around Toledo will be merged into the main company.

The first, the Holland Home Telephone Company, has been absorbed, and the assignment filed with the county recorder.

The Holland company is a part of the old Home Telephone Company which was merged with the Ohio State Telephone Company years ago. It was originally capitalized at $5,000, but has grown into considerable value since. It has operated under a separate charter.

Another Ford Story

A Ford runabout automobile owned by the New York Telephone Company and driven by J. W. Evans, superintendent of the Westchester and Rockland divisions, was swallowed up by the waters of the Hudson River off Tarrytown, when it broke through thin ice. The car disappeared beneath the ice slowly. Mr. Evans jumped and landed on solid ice.

A telephone traffic schedule planned by the Women's Council of Defense at East Orange, N. J., for the period of the war, provides that East Orange women must cease long conversations at certain periods every day.

Saving Mailing Expense

Beginning March 1, 1918, the Fort Atkinson branch of the Wisconsin Telephone Company will hold the monthly bills of subscribers that do not contain toll charges.

This plan will save the expense of delivering or mailing and Manager H. G. Miller asks that all subscribers co-operate and make the plan a success. As the amount is the same each month and is known to the subscriber, it will be an easy matter for him to step into the office and pay, or send a check in settlement for the service, before the 15th of each month.

Brevities of the Business

The Activities of the Whole Telephone Field Told in Short Paragraphs

PERSONAL NOTES.

C. B. Bavington, for the past two years local manager of the Southwestern Bell Telephone company of Henryetta, has gone to Okmulgee, where he will make his future home, having been promoted to the position as manager of the company's exchange at that city. He is succeeded by George C. Bearden, formerly cashier of the Tulsa office.

James C. Vail, for several years secretary of the original Bell Telephone Company, died in Miami, Fla., at the age of seventy-four years. Until six years ago, when he retired, he had been associated with his brother, Theodore N. Vail, president of the American Telephone & Telegraph Company. He was born in Morristown, N. J., and served during the Civil War as an officer in the Paymaster's Department of the navy. He had written extensively on the development of the telephone and telegraph.

Charles W. Smith, Jr., has been appointed local manager for the Texas Telephone Company, Waco, Texas, succeeding H. M. Cox, who has been appointed commercial manager for the company at Waco and surrounding counties.

S. L. Hunt, who has been superintendent of the Middlebury Telephone Company, Middlebury, Ind., for 15 years, resigned recently and has accepted a similar position with the Home Telephone Company of Elkhart County at Elkhart.

F. W. Webster, formerly special agent of the Southern Bell Telephone & Telegraph Company, Atlanta, Ga., has been appointed general manager of the Gainesboro Telephone & Telegraph Company, Carrollton, Ga., succeeding L. K. Smith, who recently resigned.

J. S. McGrann, local manager for the Dakota Central Telephone Company at Mobridge, Selby and Java, S. D., was recently installed as district manager with headquarters at Ipswich. In this capacity Mr. McGrann has charge of the exchanges at Ipswich, Roscoe, Hosmer, Bowdle, Java, Selby and Mobridge, and all toll lines in that territory.

R. W. Thacker, manager of the Southwestern Telephone Company at Nacagdoches, Tex., has left there for Beaumont to take a position with the plant department of the company.

E. W. Sims, for several years an employe of the Dallas Automatic Telephone Company, at Dallas, Texas, has resigned his position. He has accepted a position with the Dallas Light & Power company and will begin his new duties at once.

Fred Metcalf, who has been with the Bastin Telephone Company, of Lancaster, Ky., the past few months, has left for Pikeville, Ky., where he has a more lucrative position.

Jay C. Mitchell while representing the Frank B. Cook Company at the Wisconsin convention at Milwaukee, fell and broke his right arm. Although it will be some time before Mr. Mitchell will again have full power of his arm, he has been working steadily and with almost his usual amount of vigor.

R. P. Canady, for the past six years local manager for the West Texas Telephone Co., at Coleman, Texas, has been promoted to the management of the Brownwood exchange.

Marvin Atkins, with the West Texas Telephone Company, at Menardville, Texas, has been made local manager at Coleman, succeeding R. P. Canady.

Announcement is made by the Central District Telephone Company at Pittsburgh, Pa., of the appointment of W. B. Clarkson, division manager, as general commercial superintendent of the Chesapeake & Potomac Telephone Company, at Baltimore, Md. Mr. Clarkson's successor in Pittsburgh is P. C. Staples, publicity manager of the Bell Telephone Company in Philadelphia.

Albert Thomas Brennan, 59, first manager of the Newark Telephone Company exchange, when the Independent company was originally organized, died at his home in Zanesville.

J. A. Rogers, plant foreman of the Cumberland Telephone Company at Greenville, Miss., for a number of years, tendered his resignation and expects to leave Greenville for McComb, Miss., to enter the wholesale grocery business of J. K. Dunn, as a partner in this large and well established business. Mr. Rogers entered the service of the telephone company when a youth and rounded out twenty years with the company on February 1. The resignation of Mr. Rogers was not accepted in the usual way—he was granted leave of absence for a year and if within that time he desires to return, the position he resigns, with the salary, will be open for him and he holds his long service period without interruption.

Joseph Edwards has resigned his position as manager of the Elroy Telephone Company, of Elroy, Wis., having recently purchased the Mosinee Telephone Company, Mosinee, Wis. Mr. Edwards has had charge of the Elroy exchange for fourteen years.

Will V. Parker, Oklahoma City, who left recently for Little Silver, N. J., is the ninth Southwestern Bell Telephone employe from Oklahoma to be given a commission. He was made a first lieutenant. In all 145 of the company's men have answered the call to the colors.

John E. Boisseau, publicity manager for the Chesapeake and Potomac Telephone Company for the last six years, has been appointed publicity manager of the Bell Telephone Company of Pennsylvania and associated companies, with headquarters in Philadelphia. Mr. Boisseau went to Philadelphia for a few days to familiarize himself with his new duties, but will return to Baltimore and will remain there until some time this month. Mr. Boisseau will succeed, in Philadelphia, Philip C. Staples, who was his predecessor in Baltimore. Mr. Staples has been made division manager of the Bell system at Pittsburgh.

NEWS FROM THE FIELD.

ARIZONA

The sum of $31,000, appropriated by Mountain States Telephone & Telegraph Company, of Bishee, some months ago for improvement in Warren District, will be spent this year, it is stated by the commercial representatives of the company. Improvements are to be very extensive, including inside and outside work.

CALIFORNIA.

The construction gang of the Pacific Telephone and Telegraph Company is putting in the new line between Riverbank and Oakdale. They will also put in a new line between there and Modesto, and Riverbank will then have direct service with these two points. Heretofore communication was secured through Stockton.

Union Avenue Telephone Company, with $10,000 capital which will look after the improvement of the farmers' line to Bakersfield, was incorporated by R. M. Dodge, and Alfred Swofford. There are nine miles of line and $100 each was paid in for each mile. There are about 50 subscribers and the line is said to be in need of repair urgently. Attorney T. N. Harvey appeared for the incorporators.

COLORADO

Engineers of the Mountain States Telephone & Telegraph Company have installed what they believe to be the highest telephone service line in the world. On the Denver-Leadville toll route the company has constructed the section of the line that crosses Argentine Pass at an altitude of 13,200 feet. The newly-built section is only one and three-tenths miles in length, and it is estimated that the cost of construction was more than $12,000.

FLORIDA

With all of the directors of the Peninsular Telephone Company, of Tampa, Fla., present, except H. W. Hause, the election of officers was held which resulted in all of the old officers being re-elected. They are as follows: W. G. Brorein, president; S. A. Hoskins, of Columbus, O., vice president; B. Forrest Hicks, treasurer, and W. T. White, of this city, secretary. The following are directors: S. A. Hoskins, B. Forrest Hicks, O. E. Duman, of St. Marys, O.; Earle Peters, of Toledo; W. T. White, W. G. Brorein and H. W. Hause, of Wapakometa, Ohio.

GEORGIA

The railroad commission has passed an

order authorizing the Canton Telephone Company, of Canton, to increase its paid-up capital stock from $2,850 to $10,000.

ILLINOIS

At the annual meeting of the Geneseo and Erie Telephone Company, of Geneseo, Joseph Heller and Charles P. Roos were elected as directors. The hold-over directors are George Perkins, of Spring Hill, and Wallace Kempster, living near Hillsdale. The directors organized by electing Joseph Heller as president and Charles P. Roos as secretary-treasurer. Secretary Roos has held his position and looked after the collections and disbursements for the company for a period of fourteen years in a most satisfactory manner. The company is in fine condition, has excellent lines and is well equipped to serve its patrons and the public.

The annual meeting of the Osco Mutual Telephone Company of Geneseo was held recently, with the president, R. G. Neville, presiding. There were a number of stockholders present. Reports from the directors of the various lines showed that all dues and assessments were paid up. The secretary, A. L. Westerlund, submitted his report showing amount of collections and disbursements. The report showed a balance in the treasury of $203. After discussion it was decided to increase the assessment for the coming year, making it $8.00 for switching and repairs on lines.

INDIANA

At the annual meeting of the stockholders of the Decatur County Independent Telephone Company, of Greensburg, F. D. Armstrong of Westport, W. D. Pleak and Charles Zeller, of this city, were re-elected directors for the ensuing two years.

The Metropolitan Telephone & Telegraph Company has paid the taxes and redeemed its pole line in Allen county, Ind., which was disposed of at a sheriff's sale to satisfy taxes said to be due the county for the past five years.

John L. Hosea, manager of the Citizens Telephone Company, of Taylorsville, has bought the plant of the Taylorsville Telephone Company and has assumed charge of his new purchase. The price paid is said to have been about $4,000. The property was bought from Mrs. Barney McEvenue, H. H. Hartman and B. L. Foster. A total of 132 subscribers are served from the Taylorsville exchange. Mr. Hosea says he will make improvements in the Taylorsville exchange in a short time. His purchase of the property will not effect his status as manager of the local company in any way.

IOWA

The Farmers' Mutual Telephone Company of Rock Rapids, Ia., held its annual meeting at the court house February 9 and re-elected the following officers T. F. Collins, president and manager; John Rohlff, vice president; A. G. Miller, secretary and treasurer. Directors, representing the various lines were elected as follows: No. 1, Henry Griesse; No. 2, T. F. Collins, No. 3, J. C. Vogel; No. 4, Peter Behr; No. 6, M. F. Hockstedler; No. 7, Ole Reemts; No. 8, Anton Nicloy; No. 10, R. A. Jefferis: No. 11, C. K. Vogel; No. 12, John McGraw; No. 13, John Rohlff; No. 14, J. H. Baxter; No. 16, Sam Larsen; No. 17, Archie George; No. 18, A. H. Meester. The assessment was placed at $8 a year, the same as it has been for the past year. It is payable in March and delinquent in April, and the penalty for delinquency is 10 cents a month.

The Iowa Hilton Telephone Company, of Conroy, held its annual meeting and the following officers were re-elected: President, J. D. Frick; vice president, J. H. Halverson; secretary, John Ahrens; directors, D. Heitshnsen, D. Schwarting and George Trumble, Arthur Wiebold, switchboard operator and line overseer.

The Burchinal-Clear Lake Telephone Company, of Cedar Lake, held its annual meeting at E. H. Rich's office. The following officers and directors were elected: President, E. H. Rich; vice president, Tans Tokel; secretary-treasurer, Ben Skadeland; board of directors, Walter Atkinson, Frank Ott, Ed. Long, W. F. Rich, Ned O'Neil. The company has strung new wire over quite a portion of its line and has made other improvements the past year. More improvements is contemplated for this year.

The stockholders of the Sac County Mutual Telephone Company met in Odihalt and re-elected the old officials without opposition. The financial report showed the company had done well last year, the receipts caring for current expenses and upkeep and some extension work and giving shareholders free phone rent.

The Grinnell Farmers' Telephone Company, of Grinnel, was organized and officers for the ensuing year were elected by the farmers of the vicinity at a recent meeting. Committees were appointed to secure a building and equipment. The following men are charter members of the new company: E. D. Forehand, T. A. Harris, L. L. Hafkey, Myron Sears, G. V. Dimit, B. A. Abel, W. J. Ahrens, J. G. W. Hannay, H. A. Ahrens, A. Moxley, W. Hoover, W. McDowell, B. C. Buck, J. A. Hamor. M. W. Flanagan, H. W. Erikson, F. N. Wesco, T. H. McIlrath, H. I. Gillespie, H. McFate, V. B. Bailey, H. C. Ahrens, W. J. Hays and Fred M. Dole.

its annual election at Council Grove and

KANSAS.

The Mutual Telephone Company held the following men were elected to office: Lloyd Garner, president; Clark Williams, secretary; C. C. Miller, treasurer. Twelve directors as follows: Messrs. John McClintock, Craig North, Henry Smith, Paul Becker, Pete Scharp, George Torgeson, George Bond, Ed. Edgerton, Tom Johnson, Russel Dodderidge, Frank Knudson and Albert Ek.

The Southwestern Bell Telephone Company is making improvements and additions to the local exchange at Coffeyville, which will cost in the neighborhood of $20,000 and will bring about improvement in the service.

KENTUCKY

The stockholders of the Cumberland Telephone and Telegraph Company held their annual meeting in Louisville. The following were elected directors: U. N. Bethel, New York; Jas. S. Robinson, Memphis, Tenn.; N. C. Kingsbury, New York; W. T. Gentry, Atlanta; Chas. H. Wilson, New York; V. E. Shwab, Nashville; J. M. B. Hoxsey, Atlanta; Jas. E. Caldwell, Nashville; John W. Barr, Louisville; Leland Hume, Nashville; J. Epps Brown, Atlanta; W. W. Berry, Nashville; Theo. N. Vail, New York; W. R. Cole, Nashville; W. S. Bransford, Nashville. A report showing results of the operations of the company's business for the year 1917 was presented to the meeting and referred to the newly elected Board of Directors for further consideration and attention.

The annual meeting of the stockholders of the Southern Bell Telephone and Telegraph Company of Kentucky was held in the offices in the Columbia building. The following were elected directors to serve during the ensuing year: W. T. Gentry, J. M. B. Hoxsey, J. Epps Brown, Addison Maupin, of Atlanta; John C. Doolan, J. B. Brown and D. F. Turnbull, of Louisville. The directors organized by the election of Col. W. T. Gentry, president; J. Epps Brown, first vice president; J. M. B. Hoxsey, second vice president and treasurer; A. Maupin, secretary and assistant treasurer; Hunt Chipley, general counsel; D. F. Turnbull, general manager; L. K. Webb, commercial superintendent; C. D. White, acting superintendent of plant; E. D. Hill, superintendent of traffic.

Lee County Telephone Company, Beattyville, capital $3,000. Incorporators, H. D. Parrish, Charles Eveleth and Chester Gourley.

Racoon Telephone Company, Congo; capital $300. Incorporators, J. J. Taylor, George Wyatt and D. S. Reams.

MASSACHUSETTS

J. A. Rogers, for a number of years plant foreman of the Cumberland Telephone Company at Greenville, and who made friends of his associates in the different departments of the company as well as among the people generally, was kindly remembered by officers and employes of the company before his departure for McComb City, where he enters business. A handsome traveling bag of leather, purchased by the employes, all contributing because they wanted to do so, was presented to Mr. Rogers on the eve of his departure, as a testimonial of the high esteem in which he was held by those who knew him in his daily walk.

MICHIGAN

The stockholders of the Valley Home Telephone Company, of Bay City, held their twentieth annual meeting in Saginaw; heard reports of a prosperous year's business and elected the following directors: William F. Hemmeter, Charles E. Lown, John Leidlein and Clyde O. Trask, of Saginaw; Martin L. DeBats, Archibald H. McMillian, Edward Carrington and Dr. R. W. Brown, of Bay City; Charles Wolohan, of Birch Run; James P. Gibbs, of Ithaca, and Charles W. Liken, of Sebewaing.

At the annual meeting of the Central Michigan Telephone Company, of Laingsburg, all the directors, consisting of H. H. Pulver, F. B. Smith, W. H. Rowley, B. F. Brown, William Austin, William Lacey and C. C. Woodruff were re-elected. H. H. Culver was chosen president and Ezra Morgan, manager.

The directors of the Livingston County Mutual Telephone Company met in Lansing and elected officers for the ensuing year. The newly elected officers are as follows: President, Fred Kuhn, of Fowlerville; vice president, Frank E. Bidwell, of Brighton; secretary and treasurer, Clark H. Miner, of Howell. For the first time in many years the company payed a six per cent dividend for the past year which has just been turned over to the stockholders.

MINNESOTA

The annual meeting of the stockholders of the Atwater Telephone Company, of Willmer, Minn., was held at the office of the secretary on Thursday evening, January 31. The reports of the secretary and treasurer for the preceding year were considered and approved, and the following officers elected for the ensuing year: Peter Larson, president; H. W. Jones, vice president; Chas. A. Swenson, secretary; J. A. Johnson, treasurer, and D. F. Senechal, director.

George Dubois, who has been foreman of the construction department of the Central Union Telephone Company at Cuya-

hogo Falls, for the last 18 months, has resigned his position to take a position with the Western and Southern Life Insurance Company.

At the annual meeting of the Park Region Telephone Company held at Fergus Falls, it was decided to make an extension of the system down towards Ashby and to string a wire direct to Ashby connecting with the local and Underwood centrals. The following officers were elected: M. N. Rovang, president; Fred Vatlo, vice president; H. G. Hoff, secretary; E. S. Evenson, treasurer; L. A. Boe, A. M. Anderson, A. P. Haarstad, C. E. Larson and S. M. Skrove, directors. The assessment for the ensuing year will be $5.00.

The annual meeting and election of officers of the Greenfield Farmers' Telephone Company was held at Kellogg on Saturday, January 26. H. G. Tushaus, Jacob Howe, J. H. Schouweiler, Anton Schuth, A. H. Passe, John Wallerich and John Riester were re-elected as the board of directors. The company has installed many new phones during the past year, and a considerable amount of new stock was sold.

MONTANA

The Toole County Telephone Company, of Sweetgrass, has filed articles of incorporation, through Kenneth G. Luke and others, capital stock $50,000. A line is to be constructed between Shelby and that place.

NEBRASKA

At the annual meeting of the Craig Telephone Company it was ordered that all lines be repaired and that a supply warehouse be erected. The report showed a cash balance on hand of $142 and bills receivable of $1,227, with all debts paid. In view of the excellent financial condition, the assessment for the year was reduced to $12 a share. The following were elected directors: W. D. Romans, president; Isaac Malette, manager; W. J. Freeman, C. E. Cram, George Wagner, Chris Christensen, Jesse Freeman, Ed. Goodman and R. H. Thurber. The board re-elected R. F. Whitney as secretary-treasurer.

NEW JERSEY

The New York Telephone Company at Bayonne, is contemplating the construction of a one-story cable house on First Street, near Lord Avenue, for which permit has been granted.

NEW YORK

The Bell and Federal Telephone Companies at Pen Yan, have formed a merger, according to advises received in this village by the stockholders of the Federal Telephone Company. The business of the Federal Company will be turned over to the Bell people as soon as an inventory can be taken. There will be but one exchange in this village when the merger takes effect. The Federal Company has more than 1,500 telephones in operation in this village and the Bell about 200.

Due to an increase of almost $5,000,000 in the amount of capital stock outstanding of the New England Telephone Company during the last year, the net income available for dividends was smaller per share than in the previous year. The decrease, however, is not due entirely to the capital increase, as net profits for the year were smaller than in 1916, the amount for the last year being $5,152,000, against $5,317,000 in the former year. Balance available for dividends for 1917 was $4,112,000, equal to $6.71 on $61,256,000 capital stock, against $7.68 on $55,295,000 of capital stock in 1916.

NORTH DAKOTA

The farmers of Loam and Hope townships have organized the Loam-Hope Telephone Company with the following directors: Ed. Clairmont, N. A. Mostad, P. O. Pederson, Lawrence Pederson and Thos. Hutton. Seyward Pederson was named as secretary and N. A. Mostad, treasurer. It is understood that work will start early in the spring. The line will have connection with the Langdon telephone exchange.

OHIO

The Medina County Farmers' Telephone Company of Wadsworth, elected the following directors for the ensuing year: F. J. Kindig, of Montville; H. V. Hanan, of Sharon; E. O. Yoder and W. K. Friedt, of Guilford; W. W. Swigart, of Sharon; E. A. Hottenstein, of Granger, and Mr. Hazen, of Sharon. The new directors organized and chose F. J. Kindig for president; Mr. Hazen, vice president; W. W. Swigart, treasurer; H. V. Hanan, secretary.

At the annual meeting of the telephone company at Ucedina, the following were elected directors: F. J. Kindig, E. A. Hottenstein, C. L. Hazen, W. W. Swigart, W. K. Friedt, H. V. Hanan and E. O. Yoder. The officers are: President, F. J. Kindig; vice president, C. L. Hazen; secretary, H. V. Hanan; treasurer, W. W. Swigart. Forty-two stockholders voted in person and 75 by proxy; four men casting 427 of the 822 votes. Each of four directors elected, who received the highest vote, received about double the number of votes that each of the other three received.

At a recent meeting of the directors of the Eaton Telephone Company the old officers were re-elected as follows: President, C. F. Brooke; vice-president, C. B. Cokefair; secretary, L. D. Lesh; treasurer, Elam Fisher; superintendent, Everett Wysong. Directors, U. J. Poffenberger, C. E. Albright and T. W. Mitchell.

The Camden Telephone Company, in which a number of Eaton people have stock, elected officers as follows: President, Ed. McCord; vice president, Lee Danser; secretary-treasurer, Chas. Marlatt; manager, Howard Pattison. Directors, Elam Fisher, C. B. Cokefair and C. F. Brooke.

At the meeting of the stockholders of the Harrison & Jefferson Telephone Company of Steubenville, held at the office of the company in Cadiz, the following directors to serve for the ensuing year, were elected: C. A. Branson, H. B. Starkey, W. C. Clifford, H. M. Thompson, M. Moorehead, M. B. Hoobler, R. M. Symonds, A. P. Sheriff, Samuel Hall, John H. Haverfield and Frank B. Grove.

Fire starting from a defective flue completely destroyed the telephone office and residence of P. O. Rummell at New Weston. The telephone equipment installed in the house, which was owned by the Greenville Home Telephone Company, was completely lost, with the exception of the switchboard. C. Kipp, manager of the telephone company, stated that the loss would be about $800, with $400 insurance.

Purchase of supplies valued at $20,000 to be used this year was authorized at the annual meeting of the stockholders of the Black River Telephone Company of Lorain. All of the old directors and officers were re-elected. Business is increasing with the company, reports showed. In January a gain of 87 telephones was made. Included in the supplies are two carloads of cable to be used in extending the service. Directors elected were E. M. Pierce, W. B. Thompson, L. A. Fauver, A. V. Hageman, N. C. Alten, William Honecker, B. G. Nichols. Officers chosen were: E. M. Pierce, president; William Honecker, vice president; L. A. Fauver, secretary; H. E. Hageman, assistant secretary; A. V. Hageman, treasurer. O. N. Mowery, superintendent.

C. E. Harmon is the new manager of the Andover Telephone Company, taking the place of C. W. Wood, who resigned to attend to other duties.

At the annual meeting of the stockholders and elections of officers and directors for the Newark Telephone Company Charles H. Spencer was named president of the company, succeeding R. W. Smith, and the report of the manager, Charles E. Hollander, given in detail, showed a steady and satisfactory growth of the company, which now has 6,500 subscribers. During the past year the plant has been greatly enlarged, an addition of a number of rooms having been made to the central exchange in the Arcade. A new toll room was added to facilitate the long-distance work, and to make way for the added local telephones. The election of officers resulted as follows: President, Charles H. Spencer; vice president, E. T. Rugg; treasurer, W. S. Weiant; secretary, Charles E. Hollander. Directors, Judge Robbins Hunter, George B. Sprague and Harry Swisher.

OKLAHOMA

The Southwestern Bell Telephone Company in Lawton has a new manager in the person of Marvin Holland of Oklahoma City, who succeeds Joe Higgins, who leaves to take charge of the Hugo district.

PENNSYLVANIA

At a meeting of the Mainville Telephone Company at Bloomsburg officers and directors for the ensuing year were elected as follows: A. F. Deaner, president; Geo. Shuman, vice-president; Pierce Deaner, treasurer; James Platt, secretary; directors, Frank Deaner, Frank Shuman, D. W. Shuman, Samuel Shuman, Pierce Gruver, James Platt, Harry Platt, Harrison Miller, H. Fisher, Harry John and Wm. Zehner of Bloomsburg. During the year the directors paid off a $200 bond, installed several new telephones and paid a 7 per cent dividend.

At the annual meeting of the stockholders of the Kittanning Telephone Company the old board of directors were re-elected as follows: Dr. C. J. Jessop, Dr. F. C. Monks, E. S. Hutchinson, Charles E. Meals, Robert M. Trollinger, Charles Neubert, K. B. Schotte.

The Conestoga Telephone and Telegraph Company of Birdsboro reorganized by electing John A. Flannery, president; G. Frank Handwork, vice-president; H. A. Long, secretary; F. M. Brown, treasurer, and John K. Stoltzfus, general manager. It was decided to erect a 50-pair cable from the present cable to Baumstown. A new three-position switchboard will be installed in the Birdsboro exchange and a two-position type in the Morgantown exchange. Last year 33 new telephones were added, the total installation for the 12 months being 141. The full number in service at present is 992. The directors and stockholders were well pleased with last year's operations, and the company, which had a small beginning a dozen or more years ago, is now firmly established and a permanent concern of the town.

TENNESSEE

Hickman Telephone Company of Smith County, applied for an amendment to its charter, increasing its capital stock from $1,500 to $2,000.

TEXAS

J. E. Farnsworth of Dallas, vice-president and general manager of the Southwestern

Telegraph and Telephone Company, in Austin, informed Mayor Wooldridge that the merger of the two telephone companies in Austin had finally been approved by Attorney General Gregory. Mr. Farnsworth said that the terms of the merger would be carried out at once, the property of the United Telephone Company being taken over and the unnecessary lines removed. The new building at Congress avenue and Tenth streets, for which the foundation is being prepared, will be constructed according to plans that now are ready, said Mr. Farnsworth. He expressed the belief that work on the building would be begun in a few weeks.

J. L. Boone of Sherman has accepted the position as manager of the Bonham Telephone Company of Bonham assumed the duties of the office. He is a thorough telephone man, having spent several years in the service.

Cameron County Telephone Company, San Benito; capital stock, $15,000; incorporators, John T. Lomax, W. D. Carpenter and Samuel Spears, all of San Benito.

The Southwestern Telephone Company won the first tilt in its fight with the City of Fort Worth for a general raise in telephone rates. Judge Meek in federal court here granted a temporary injunction restraining putting into operation the Fort Worth ordinance fixing telephone rates as charged at present. The telephone company filed supersedeas bond of $25,000 and will put the proposed raise in rates into effect March 1.

VIRGINIA

Amendment to charter of Bluefield Telephone Company, Tazewell, increasing its capital stock from $250,000 to $300,000.

WASHINGTON

The Lower Mud Creek Telephone Company has petitioned the Walla Walla county commissioners for a 50-year franchise to construct, maintain and operate a telephone and telegraph line over certain roads in the county.

The city council recently granted the Pacific Telephone & Telegraph Company of Colfax a ten-year franchise to operate in the city.

The Rosalia Telephone Company, which has owned and operated the telephone system at Rosalia for a number of years, has just filed its annual report, showing a prosperous year, despite nearly 50 per cent increase in cost of making repairs and improvements. The company declared its regular dividend of $1 a share on the stock, which has a par value of $5 a share, making the annual dividend 20 per cent. The officers are: R. P. Turnley, president; F. J. Wilmer, secretary, and M. Meuli, treasurer. The report shows that the company has 817 telephones, as compared with 794 one year ago. The company operates lines through the rural districts and to Malden, six miles distant, covering a wide territory in north Whitman and southern Spokane counties.

WEST VIRGINIA

Stockholders of the Cumberland Valley Telephone Company of Martinsburg, at their annual meeting in Hagerstown elected the following officers: President, William J. Lescure, Harrisburg; vice-president, Oscar K. Kines, Harrisburg; secretary and treasurer, Cameron L. Baer, Harrisburg; directors, J. Augustine Mason, Milton Kohler, J. Hubert Knode, Franklin M. Thomas and Daniel A. Thomas, Harrisburg; G. E. Twigg, Chambersburg; Henry M. Tracy, Harrisburg; W. Newton Long, Hagerstown; W. P. Sescure, O. K. Kiver and C. L. Baer.

WISCONSIN

At a meeting of the Sugar Bush Mutual Telephone Company, Alec Hutchison was elected president to succeed Gus Paul, and R. J. Strossenreuther was chosen secretary-treasurer to succeed Thomas Gough. All other business that came before the meeting was cared for.

Articles of incorporation were filed in the office of secretary of state for the Junction Telephone Company, Stanley; capital, $1,000; incorporators, F. J. Brzostowicz, Lawrence Janicki, Ole H. Larson and two others.

Past year has been one of the most successful in the history of the Hager City Telephone Company, according to reports presented at the annual meeting of the corporation, held at Hager City. Officers were elected as follows: President, A. F. Andersen; vice-president, John Hilden; secretary and treasurer, M. C. Nelson; manager, H. J. Pumplin. Board of Directors: A. F. Andersen, M. C. Nelson, John Hilden, A. G. Swanson, Charles Hanson, D. J. Miley and Edw. Maetzold.

At the annual meeting of the State Long Distance Telephone Company at Elkhorn, the following board of directors were elected for the present year: E. J. Hooper, L. R. Whitmore, George Renner, H. H. Tubbs, C. H. Wiswell, Fred Hemstreet and John T. Tobin. S. T. Foster, L. W. Swan and Jos. Potter were named a committee to look up the matter of increasing the capital stock of the company, and report next year.

WISCONSIN

The Pigeon Valley Farmers' Telephone Company of Black Runes Falls held its annual meeting January 15, 1918 . All the officers were re-elected: President, Carl Klomsten; vice-president, Clarence Kaas; secretary, H. P. Fremstad; treasurer, H. A. Jacobson; directors, B. B. Olson, L. P. Sinrud. The company declared a dividend of six per cent of all stock sold, and still have a nice sum of cash on hand, besides setting aside the sum of one hundred dollars a year for reserve fund.

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